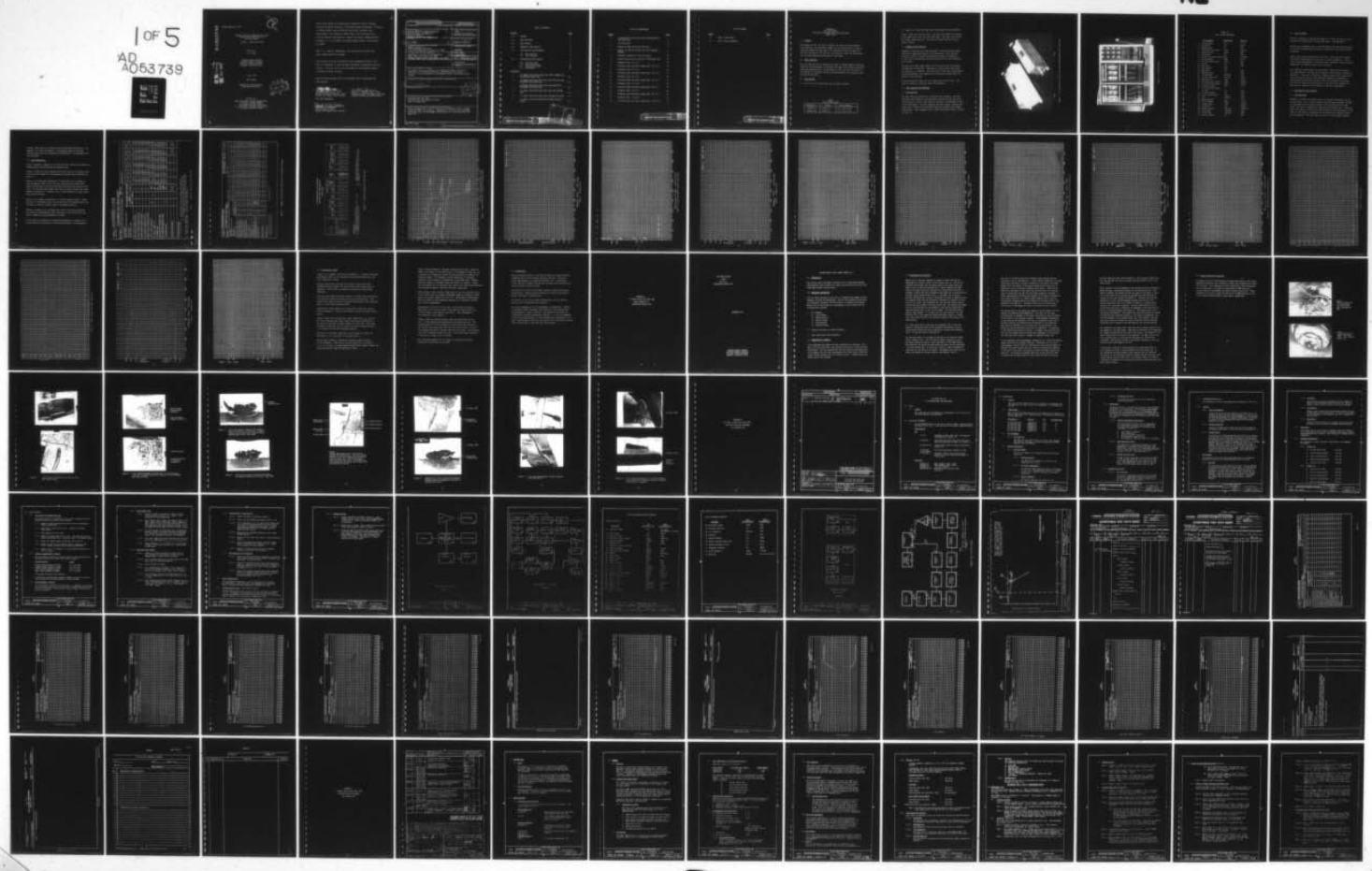
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REPORT SAMSO-TR-77-185

# DEFENSE SATELLITE COMMUNICATIONS SYSTEM TRAVELING WAVE TUBE AMPLIFIER LIFE TEST REPORT

## VOLUME I: TWENTY WATT TWTA

Prepared by:

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DSCS II, X-Band TWTA

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Data accumulated over a six (6) year life test period on DSCS II flight equivalent TWTA's is presented. Evaluation of the data is to determine trends and long term performance characteristics of traveling wave tube amplifiers.

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PROGRAM 777
LIFE TEST REPORT
HIGH LEVEL TRAVELING-WAVE TUBE AMPLIFIERS
MODEL 1202H

## 1.0 PURPOSE

The purpose of this test was to operate six high level developmental traveling-wave tube amplifiers (TWTA) for the stated period of time at operating conditions specified in the Statement of Work, Program 777. The data obtained in this test is to be used as a basis for determining the long term operating performance of each TWTA.

## 2.0 TEST OBJECTIVE

The test objective was to operate each TWTA at nominal ambient operating condition and environment to determine that each would maintain specified operating characteristics for the period of the life test as stated in The Program 777 Statement of Work for Traveling-Wave Tube Amplifier Life Testing Continuation.

## 3.0 TEST ARTICLE

3.1 The list of the units under test is shown in TABLE I.

TABLE I
LIST OF TEST UNITS

| HAC/EDD No. | TRW No. | Serial Numbers |
|---|---|---|
| B200350-121 | C31054 2-1 | 12-1, 12-2, 12-3 |
| B200350-122 | C31054 2-2 | 22-1, 22-2, 22-3 |

3.2 Figure 1(a) shows the High Level Traveling-Wave Tube Amplifier.

Figure 2 shows the Life Test Rack. The High Level TWTA's are mounted in the upper row of the left and center bays. The right bay contains the blower, power supplies, controls and elapsed time and current monitor meters.

## 4.0 SUMMARY OF TEST RESULTS

Summaries of the Life Test Data are shown in tabulations and graphs inserted at appropriate places in the discussion. This data was abstracted from the reduced recorded data attached as Appendix D. A total Life Test Operating time of 279,628 hours for the six TWTA's was recorded.

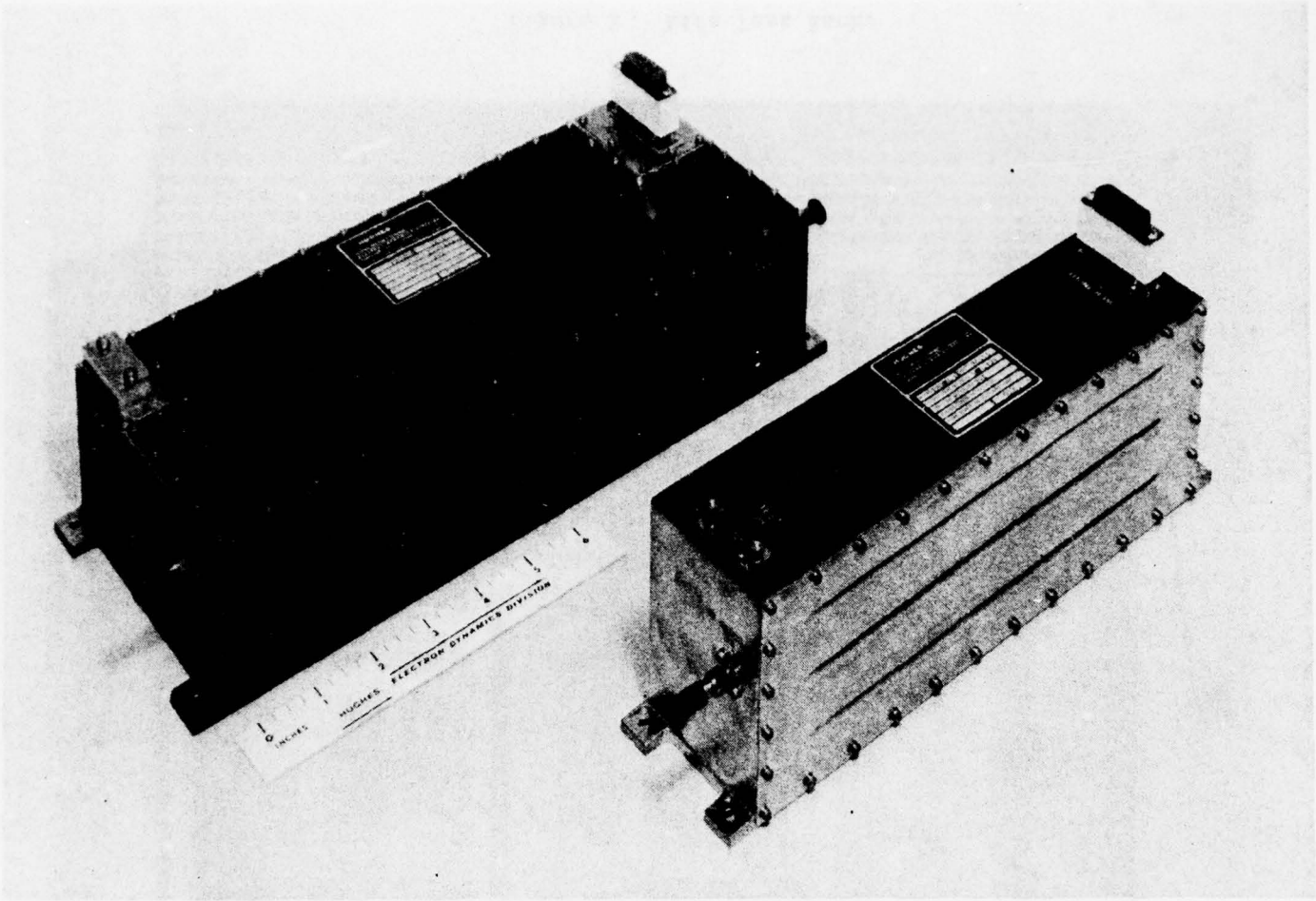
One High Level TWTA, Model 1202H, S/N 22-2 failed after 18,048 high voltage hours of operation. The mode of failure was an open heater leg adjacent to a spotweld. The cause was too much heat being applied during spotwelding. See Appendix A for Malfunction Report 2867 for details of this failure.

A second High Level TWTA, S/N 22-3 failed after 48,307 hours. The cause of failure is currently under investigation.

## 5.0 TEST FACILITY AND PROCEDURE

### 5.1 Test Facility

The test facility consisted of a three-bay rack assembly. Two bays contained twelve TWTAs in two rows which included the six high level units mounted on water cooled plates to maintain a temperature of 90°C at the base plates. One bay contained the power supply, switches and indicators to provide the specified operating conditions and elapsed time records. Test equipment used to make the periodic tests is listed in Table II.




1 (a) 1 (b)

Figure 1 (a) High Level and (b) Low Level Traveling-Wave Tube Amplifier.

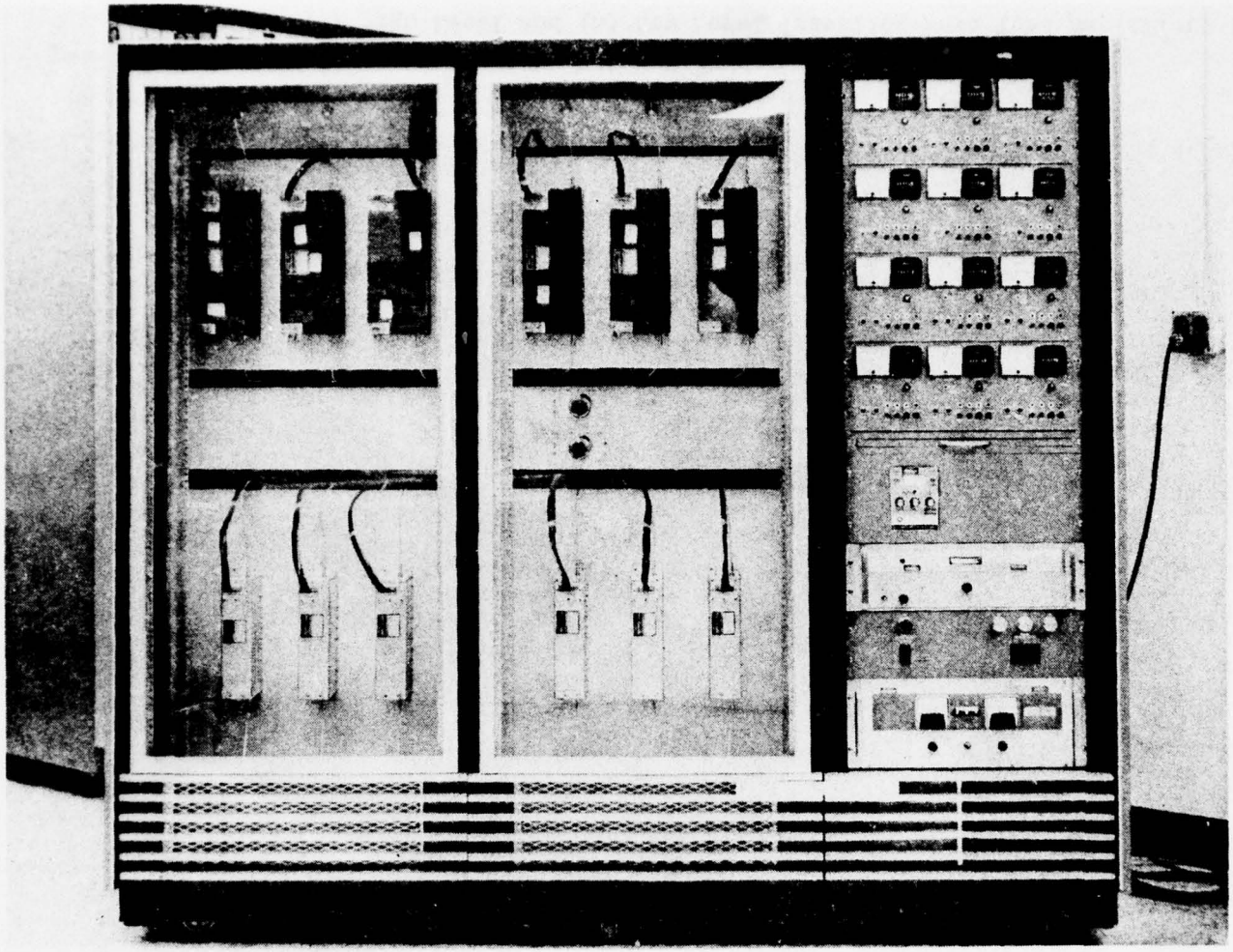


Figure 2 Life Test Rack.

TABLE II

LIST OF TEST EQUIPMENT

| | Test Equipment | Manufacturer | Model No. |
|---|---|---|---|
| 1. | Sweep Oscillator | H-P | RF Unit |
| 2. | X-Y Recorder | H-P | 7035B |
| 3. | Frequency Meter | H-P | 537A |
| 4. | 20 dB Directional Coupler | Narda | 3045C-20 |
| 5. | Crystal Detector | Alfred | 1001 |
| 6. | PIN Modulator | H-P | 8734A |
| 7. | Invertor and Leveler Amplifier | HAC | 401-8401A |
| 8. | 10 dB Attenuator | Narda | 774-10 |
| 9. | Dual Directional Coupler | Narda | 3024 |
| 10. | Crystal | H-P | 423A |
| 11. | Ratio Meter | H-P | 416B |
| 12. | Short (female) | Narda | |
| 13. | Power Meter | H-P | 432A |
| 14. | Thermistor Mount | H-P | 478A |
| 15. | 6 dB Attenuator | Weinschel | 530A |
| 16. | Low Pass Filter 8 GHz | Microlab | LA-80N |
| 17. | High Power Load | Narda | 376NM |
| 18. | 10 dB Directional Coupler | Narda | 3034B-10 |
| 19. | 20 dB Directional Coupler | Narda | 4016-20 |
| 20. | Variable Attenuator | PRD | C1110 |
| 21. | 10 dB Directional Coupler (Ku Band) | H-P | P752C |
| 22. | Low Level Waveguide | H-P | P910A |
| 23. | Coaxial Hybrid Coupler | Narda | 3034 |
| 24. | Load | Weinschel | 535-MN |
| 25. | Signal Generator | PRD | 1207 |
| 26. | 20 dB Attenuator | Narda | 777C-20 |
| 27. | DC Power Supply | Lamda | LK343FM |
| 28. | Control Box | HAC | 304083 |
| 29. | Digital Voltmeter | Fairchild | 7000-OPT-1 |
| 30. | Oscilloscope | Tektronix | 531A |
| 31. | Current Probe | Tektronix | P6042 |
| 32. | Dual X-Y Recorder | H-P | 136A |

## 5.2 Test Procedure

Periodic testing was performed according to 777 TWTA Life Test Plan and Procedure LTP B200350-400 for High Level TWTAs. See Appendix B.

External test equipment used in the individual tests with block diagrams of the test configurations are shown in Appendix B, Life Test Plan and Procedures.

Weekly tests were performed until July 1973. After that date, monthly performance measurements were made of the listed parameters. At this time, regular measurements of Insertion Loss, Attenuator Input and Output Impedances, and Cathode Activity were initiated.

Four regularly spaced Bench Tests were made. These were performed to the requirements of the High Level Acceptance Test Procedure attached as Appendix C. This data is listed on a separate sheet and is inserted as the first page of data for each individual amplifier in Appendix D. Additionally a final bench functional test was performed in accordance with the Life Test Plan and procedure at the end of the extended Life Test period. Results of this testing is included in Appendix D.

# 6.0 DISCUSSION OF TEST RESULTS

## 6.1 Life Test Data

Appendix D contains the reduced test data recorded periodically during the life test. It is the most current accurate data available, recorded in accordance with the latest issues of the specifications and test plans. The data is organized by numerically serialized unit. Following these data sheets for each unit, each parameter is plotted against a time scale so that trends or anomalies can be observed and compared against other parameters. The first page of each set of data sheets contains

periodic tests made per Acceptance Test Procedure ATP B200350-400. See Appendix C for these procedures. The remaining pages of data were recorded using Life Test Procedures LTP B200350-400. See Appendix B for this procedure.

## 6.2 Data Presentation

Figure 3 presents a summary of the Life Test Data listing the maximum and minimum values recorded during the complete test.

Figure 4 presents the data showing the initial value as a reference point and the percent change from the maximum and minimum values tabulated in Figure 3.

Figure 5 is a subjective tabulation of trends which is an attempt to show the general trend of the data over the entire test period and a general description of the form the data takes during the period of the test. It also shows the change from start to finish, whether the values showed an increase or a decrease, and, in some instances, a value within which the data varied.

Figure 6 is a graphic presentation of the TWT cathode activity. These data are not continuous plots, but are plotted at approximate equal time intervals to show the overall trend of decreasing activity.

Figures 7 through 18 are condensed data plots of selected parameters. Data points at approximately equal intervals of time are plotted, and overall trends for these parameters are shown.

The original data presents the remaining parameters in a manner which clearly shows the life trend of their characteristics. See Appendix D.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W LOMITA BLVD TORRANCE CALIFORNIA 90509

# CUSTOMER TEST DATA SHEET

**TEST NAME** HIGH LEVEL TWTA LIFE TEST DATA SUMMARY | **SPEC NO.** LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS<br>54334<br>-121<br>SN12-1 | 54651<br>-121<br>SN12-2 | 54222<br>-121<br>SN12-3 | 50066<br>-122<br>SN22-1 | 18048<br>-122<br>SN22-2 | 48307<br>-122<br>SN22-3 |
|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.140<br>1.841 | 2.285<br>1.923 | 2.000<br>1.757 | 2.695<br>2.373 | 2.296<br>2.170 | 2.209<br>1.970 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.87<br>3.81 | 3.838<br>3.700 | 3.888<br>3.810 | 3.977<br>3.750 | 3.874<br>3.780 | 3.797<br>3.65 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.383<br>3.94 | 4.442<br>4.080 | 4.078<br>4.040 | 4.473<br>4.120 | 4.060<br>4.017 | 4.170<br>4.135 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.810<br>0.510 | 0.900<br>0.620 | .500<br>.281 | .916<br>.65 | 1.900<br>1.398 | 1.055<br>0.372 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.813<br>2.499 | 2.83<br>2.490 | 2.83<br>2.54 | 2.650<br>2.370 | 3.102<br>2.754 | 2.520<br>2.209 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.6<br>43.1 | 43.50<br>43.05 | 43.45<br>43.00 | 43.70<br>43.10 | 43.55<br>43.00 | 43.55<br>43.10 |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.45#<br>53.10 | 54.50#<br>53.2 | 55.85#<br>53.80 | 54.85#<br>52.51 | 55.30#<br>54.35# | 55.50#<br>53.77 |
| $I_L$ INSERTION LOSS | | | db | 94.3<br>83.5 | 80.0<br>73.6 | 76.2<br>61.0 | 69.0<br>60.0 | 74.50<br>70.50 | 59.0<br>50.0 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 15.2<br>14.62 | 18.1<br>17.0 | 21.75<br>20.50 | 20.28<br>18.53 | 20.30<br>18.22 | 24.96<br>22.18 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 15.34<br>14.76 | 17.9<br>17.13 | 21.91<br>20.69 | 23.90<br>19.30 | 18.62<br>18.12 | 25.34<br>22.35 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 15.0<br>11.4# | 22.3<br>17.7 | 15.5<br>13.5# | 18.4<br>14.0# | 24.2<br>16.5 | 24.9<br>4.1# |
| | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | NOTE 1 | | | | | NOTE 2 | NOTE 3 |
| | | | | | | | | | |

**SIGNIFICANT EVENT NOTES**

1. Recorded Values
   a. Top number in box is the maximum value measured.
   b. Bottom number in box is the minimum value measured.
   c. # - Measured value did not meet specification limit.
2. Failed after 18048 hours. Reference Malfunction Report and Analysis 2867.
3. Failed after 48307 hours. Currently under investigation.

Figure 3 Summary of High Level Life Test Data

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. _____
PAGE OF

# CUSTOMER TEST DATA SHEET

**TEST NAME** HIGH LEVEL LIFE TEST PLAN & PROCEDURE
**SPEC NO.** LTPB200350-400

**TEST CONDITIONS**
**NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$**

**TEST CONDITIONS**
**NOMINAL INPUT VOLTAGE**

| | LIMITS | | | SN12-1 | | SN12-2 | | SN12-3 | | SN22-1 | | SN22-2 | | SN22-3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN | MAX | UNITS | Initial Value | Percent Change | Initial Value | Percent Change | Initial Value | Percent Change | Initial Value | Percent Change | Initial Value | Percent Change | Initial Value | Percent Change |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.892 | +13.10 - 2.69 | 2.050 | +11.46 - 6.19 | 1.826 | +9.53 -3.77 | 2.411 | +11.78 - 1.57 | 2.247 | + 2.18 - 3.42 | 2.014 | + 9.68 - 2.18 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.831 | + 1.02 - 0.55 | 3.838 | + 0.0 - 3.59 | 3.863 | +0.65 -1.37 | 3.977 | + 0.0 - 5.71 | 3.872 | + 0.05 - 0.05 | 3.794 | + 0.08 - 3.79 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.383 | + 0.0 -10.10 | 4.442 | + 0.0 - 8.15 | 4.059 | +0.468 -0.468 | 4.473 | + 0.0 - 7.89 | 4.041 | + 0.47 - 0.59 | 4.155 | + 0.36 - 0.48 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.560 | +44.64 - 8.93 | 0.713 | +26.22 -13.04 | 0.342. | +46.19 -17.83 | 0.795 | +15.22 -18.24 | 1.660 | +14.43 -1.78 | 0.372 | +183.6 - 0.0 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.654 | + 5.99 - 5.84 | 2.651 | + 6.75 - 6.07 | 2.706 | + 4.58 - 6.13 | 2.517 | +5.28 -5.84 | 3.003 | +3.29 -8.29 | 2.272 | +10.91 - 2.77 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.32 | + 0.64 - 0.51 | 43.30 | +0.46 -0.57 | 43.20 | +0.58 -0.46 | 43.45 | +0.57 -0.80 | 43.25 | +0.69 -0.58 | 43.25 | + 0.69 - 0.34 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.73 | + 1.34 - 1.17 | 53.90 | +1.11 -1.29 | 54.63# | +2.23 -1.52 | 53.16 | +3.18 -1.22 | 54.66# | +1.17 -0.56 | 54.06# | + 2.66 - 0.53 |
| $I_L$ INSERTION LOSS NOTE 2 | | | db | 87.00 | + 8.39 - 4.02 | 76.50 | +4.57 -1.79 | 64.80 | +17.59 - 5.86 | 66.60 | +3.60 -9.91 | 73.70 | +1.08 -5.34 | 56.90 | + 3.69 -12.12 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT NOTE 2 | | | OHMS | 14.62 | + 3.96 - 0.0 | 17.00 | +6.47 -0.0 | 20.50 | + 6.09 - 0.0 | 18.53 | +9.44 -0.0 | 18.24 | +11.29 - 0.11 | 22.18 | +12.53 - 0.0 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT NOTE 2 | | | OHMS | 14.76 | + 3.93 - 0.0 | 17.13 | +4.49 -0.0 | 20.69 | + 5.89 - 0.0 | 19.30 | +23.83 - 0.0 | 18.12 | + 2.76 - 0.0 | 27.35 | +13.37 - 0.0 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 15.0 | + 0.0 -24.0 | 20.1 | +10.94 -11.94 | 14.5 | + 6.89 - 6.89 | 17.5 | **+ 4.9** -20.0 | 24.2 | + 0.0 -31.82 | 24.4 | + 2.05 -83.19 |
| | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | NOTE 1 | | NOTE 1 | | NOTE 1 | | NOTE 1 | | NOTE 1 | | NOTE 1 |
| | | | | | | | | | | | | | | | |

**SIGNIFICANT EVENT NOTES**

1. Percent changes are derived from the differences between the Initial Value (Final Acceptance Value) and the Maximum and Minimum Value from Figure 3.
2. Initial Parameter Measurements recorded on 8/31/72

Figure 4 Summary of High Level TWTA Life Test Parameter Changes.

# 777 TRAVELING-WAVE TUBE AMPLIFIER

## LIFE TEST DATA TREND ANALYSIS

## MODEL 1202H

| LIFE TEST UNIT | MEASURED PARAMETER TRENDS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | TELEMETRY VOLTAGES | | | | | SATURATED POWER OUTPUT Po (SAT) | SMALL SIGNAL GAIN Gss | INSERTION LOSS $I_L$ | ATTENUATOR RESISTANCE | | CATHODE ACTIVITY $T_K$ |
| | INPUT CURRENT | CATHODE CURRENT | HEATER VOLTAGE | HELIX CURRENT | CATHODE VOLTAGE | | | | INPUT RAIN-OHMS | OUTPUT RAO-OHMS | |
| Model 1202H HIGH LEVEL TWTA | | | | | | | | | | | |
| S/N 12-1 | K∿ | K | ↓ | ↑ | K∿ | K∿ | ↑ OS 1.3 dB | K∿ | ↑ | ↑ | ↓ |
| S/N 12-2 | K∿ | ∿ | ↓ | ∿ | ↑ | K | ↑ OS 1.3 dB | K∿ | ↑ | ↑ | ↓∿ |
| S/N 12-3 | K∿ | K∿ | K | ↓ | K∿ | K | ↑ OS 1.7 dB | K∿ | ↑ | ↑ | K∿ |
| S/N 22-1 | K∿ | ↓ | K | K∿ | K∿ | ↑ | ↑ 2 dB OS | ↓ | ↑ | ↑ | ↓ |
| S/N 22-2 | K | K | K | K∿ | K∿ | K∿ | ↑ 1 dB OS | K∿ | ↑ | ↑ | Δ↓ |
| S/N 22-3 | K∿ | ↓ | K | Δ↑ | ↑ | K∿ | ↑ 2 dB OS | ↓ | ↑ | ↑ | Δ↓ |

SYMBOL DEFINITIONS

K - Relatively constant over entire time period
OS - Readings were out of specification limit for the majority of readings
↑ - Readings increased slightly from start to end
↓ - Readings decreased slightly from start to end
∿ - Readings varied slightly from start to end
K∿ - Indicates slight variation around a fairly constant value
Δ - Readings changed a large amount in the direction indicated
INT - Intermittent

Figure 5 Subjective analysis of life test data.

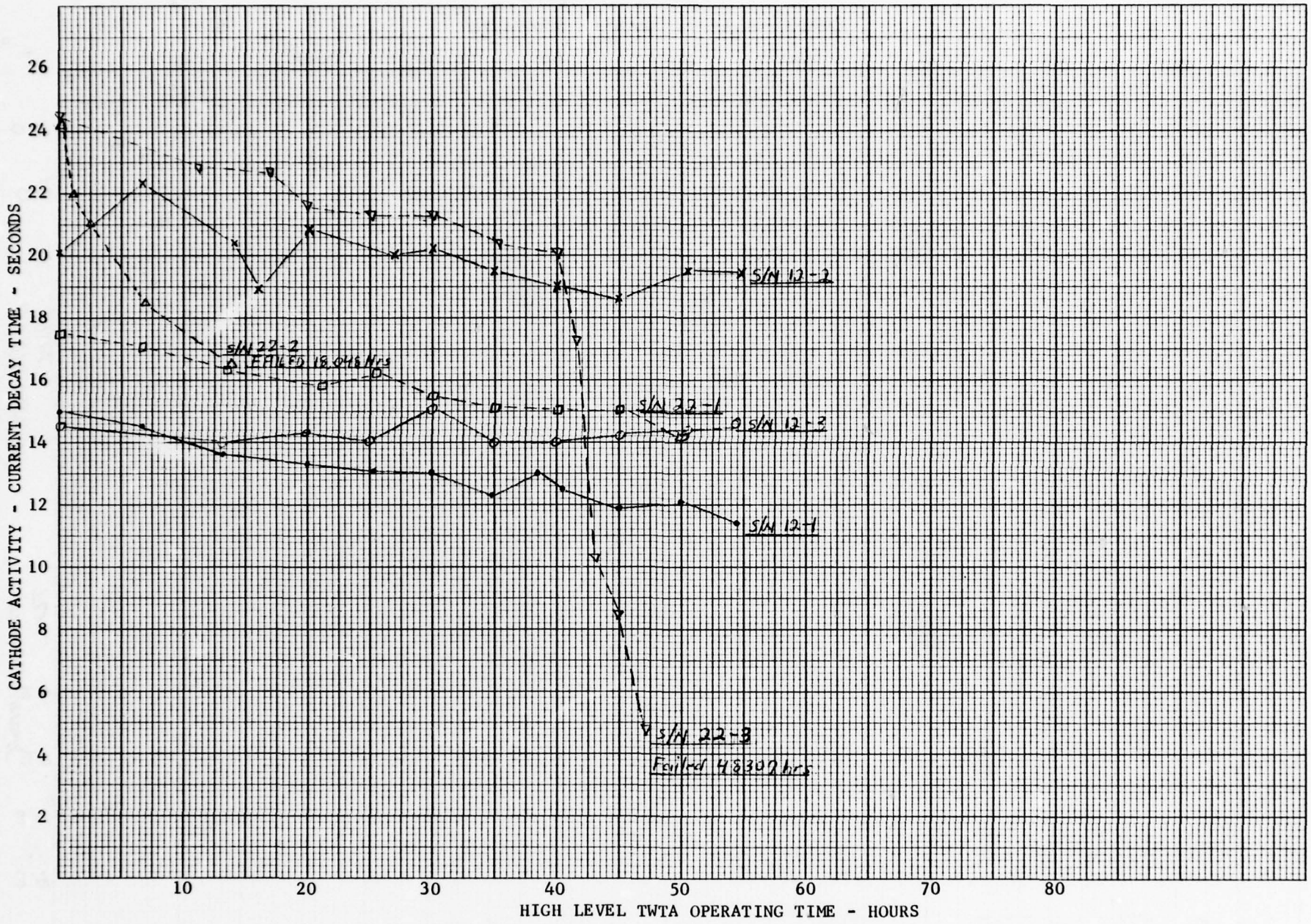



Figure 6 Cathode Activity as a Function of Operating Time.

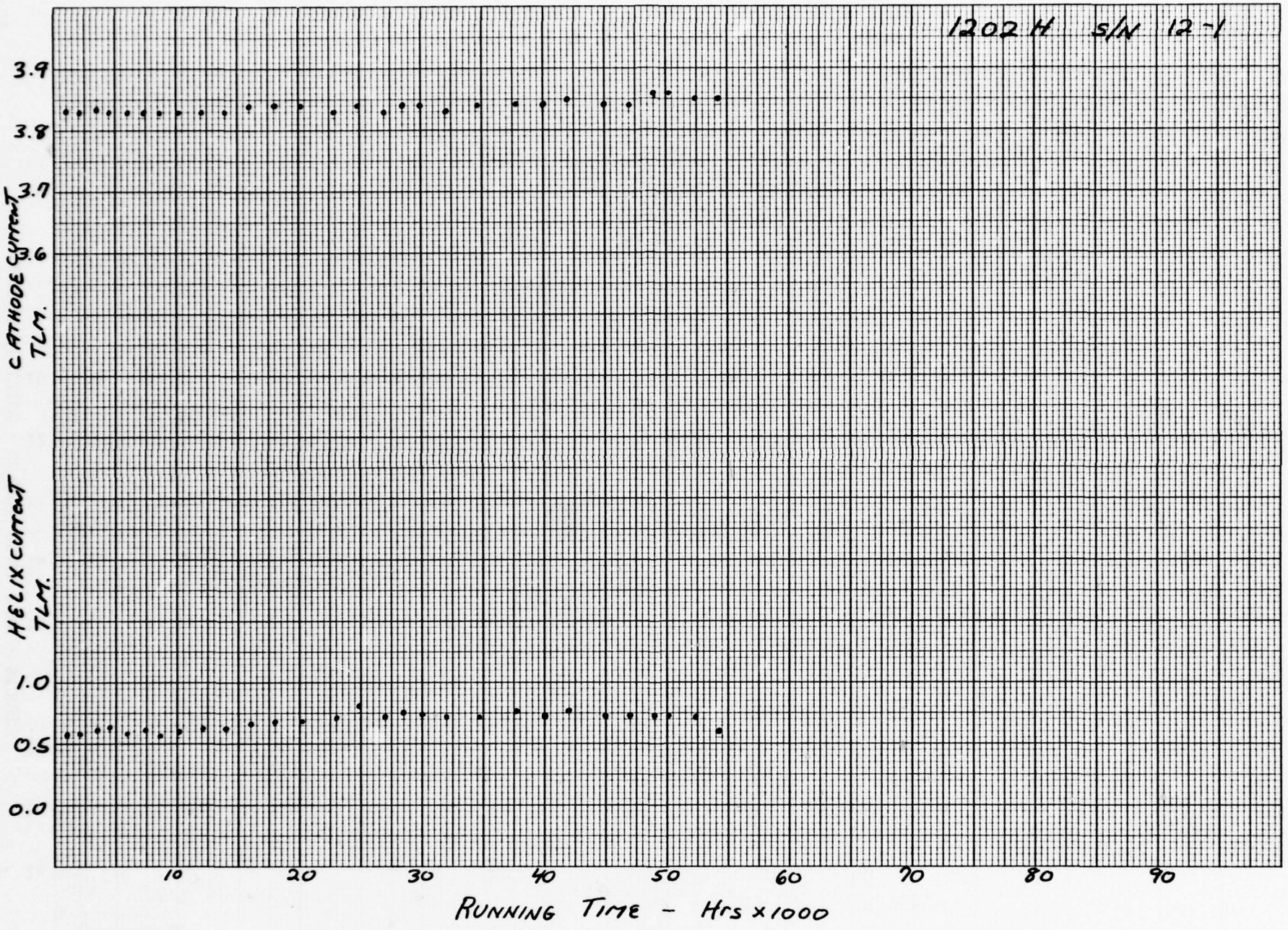



Figure 7 Telemetry data.

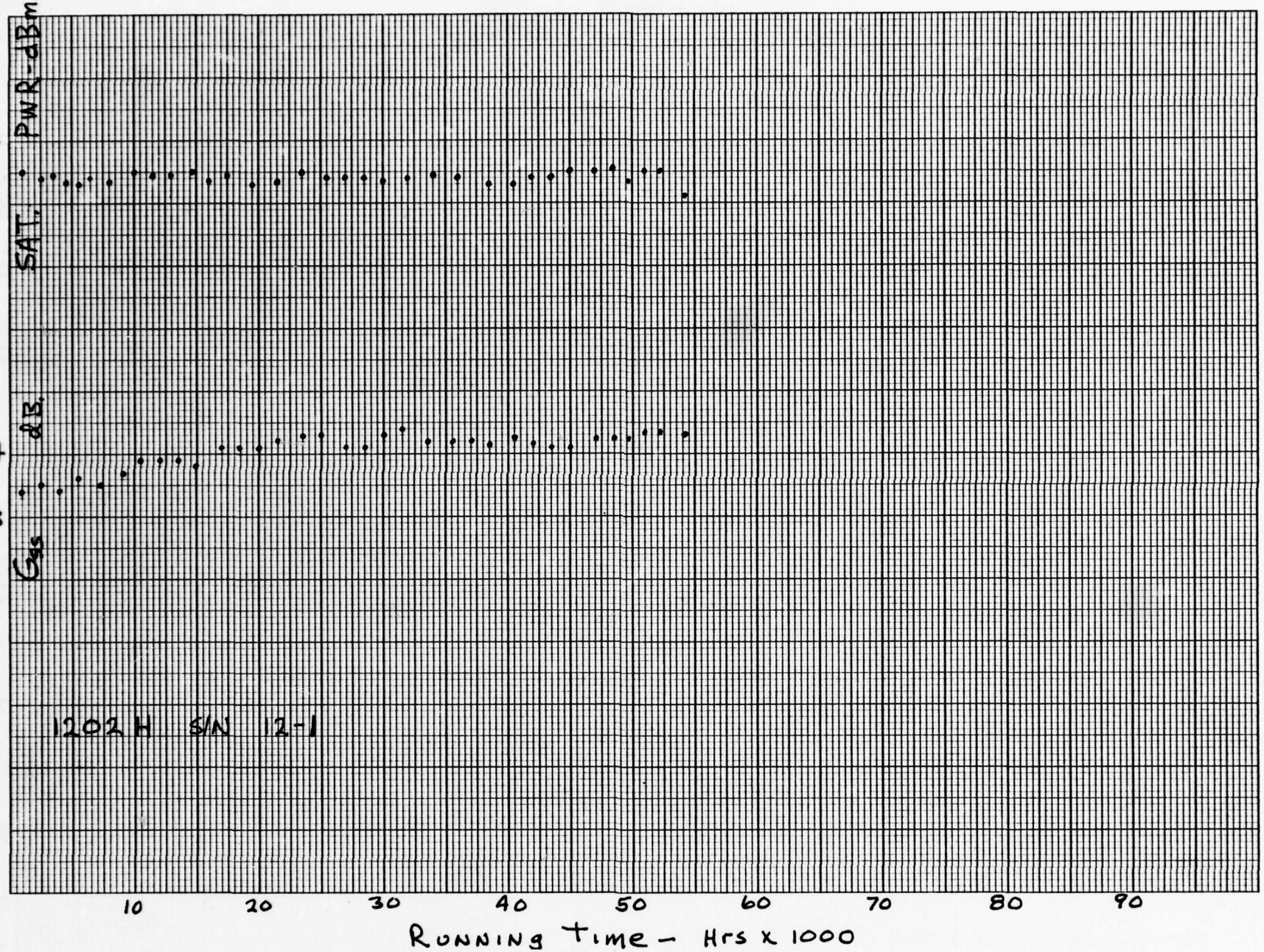



Figure 8 Saturated power and small signal gain.

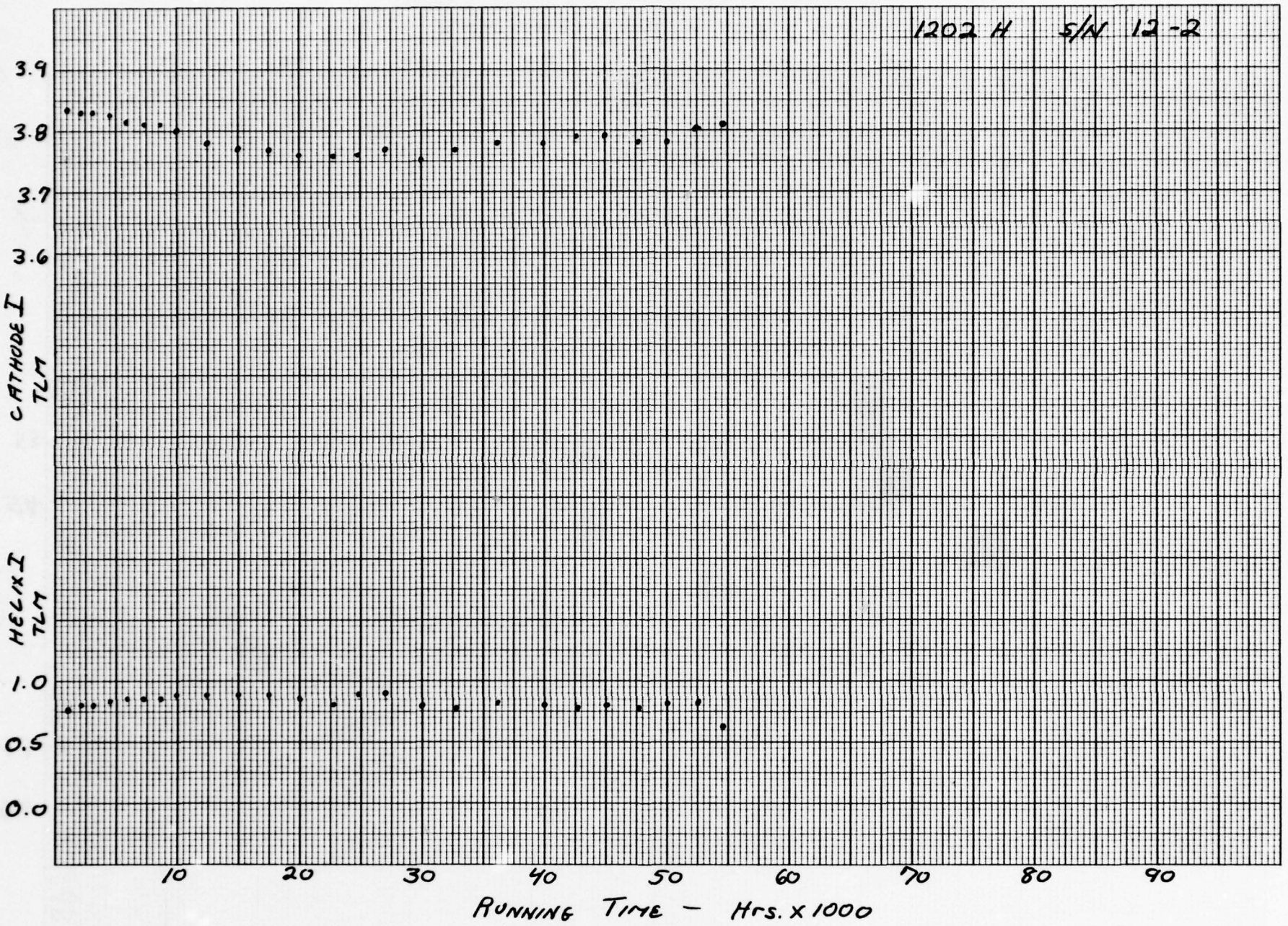



Figure 9 Telemetry data.

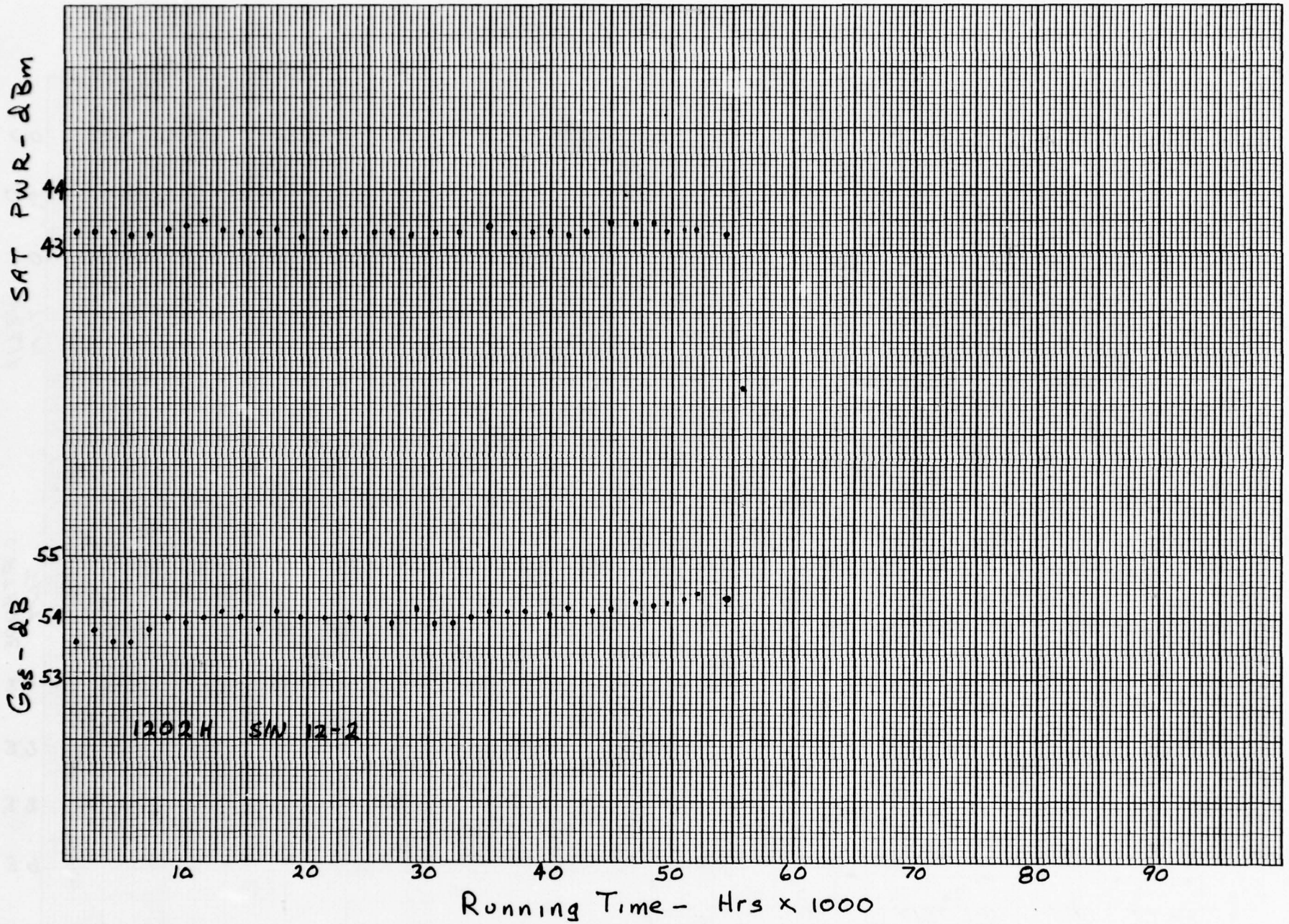



Figure 10 Saturated power and small signal gain.

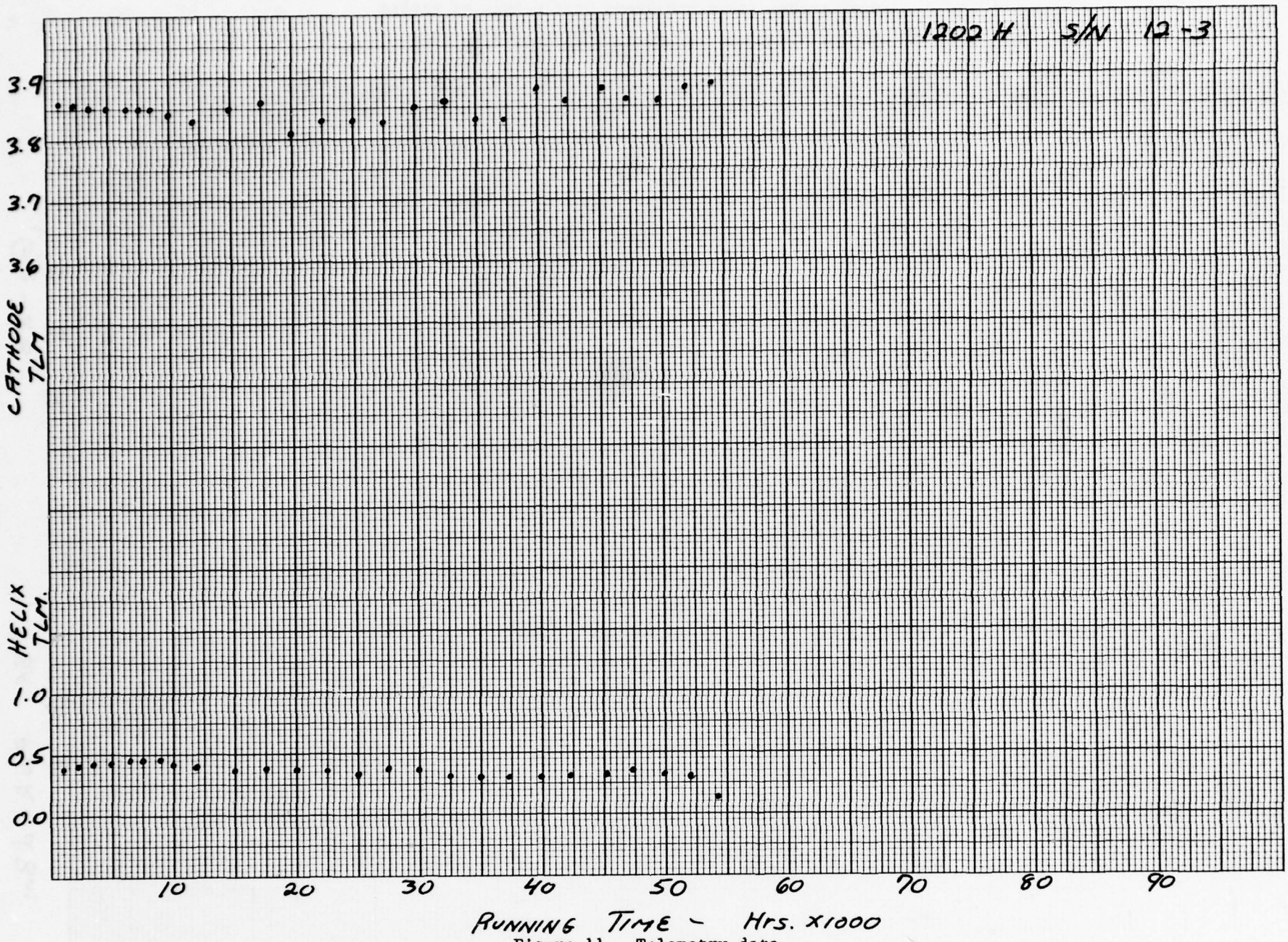



Figure 11 Telemetry data.

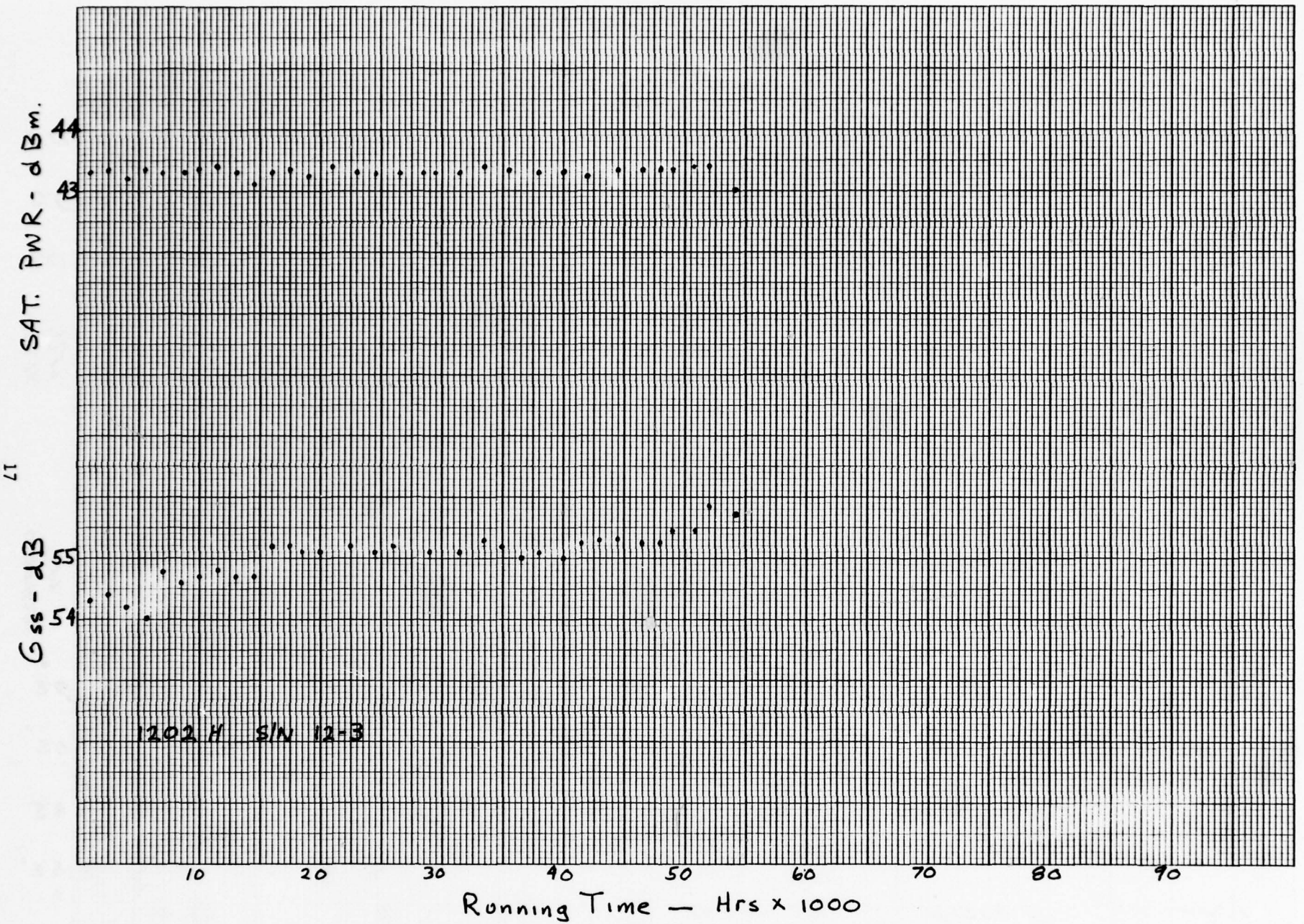



Figure 12 Saturated power and small signal gain.

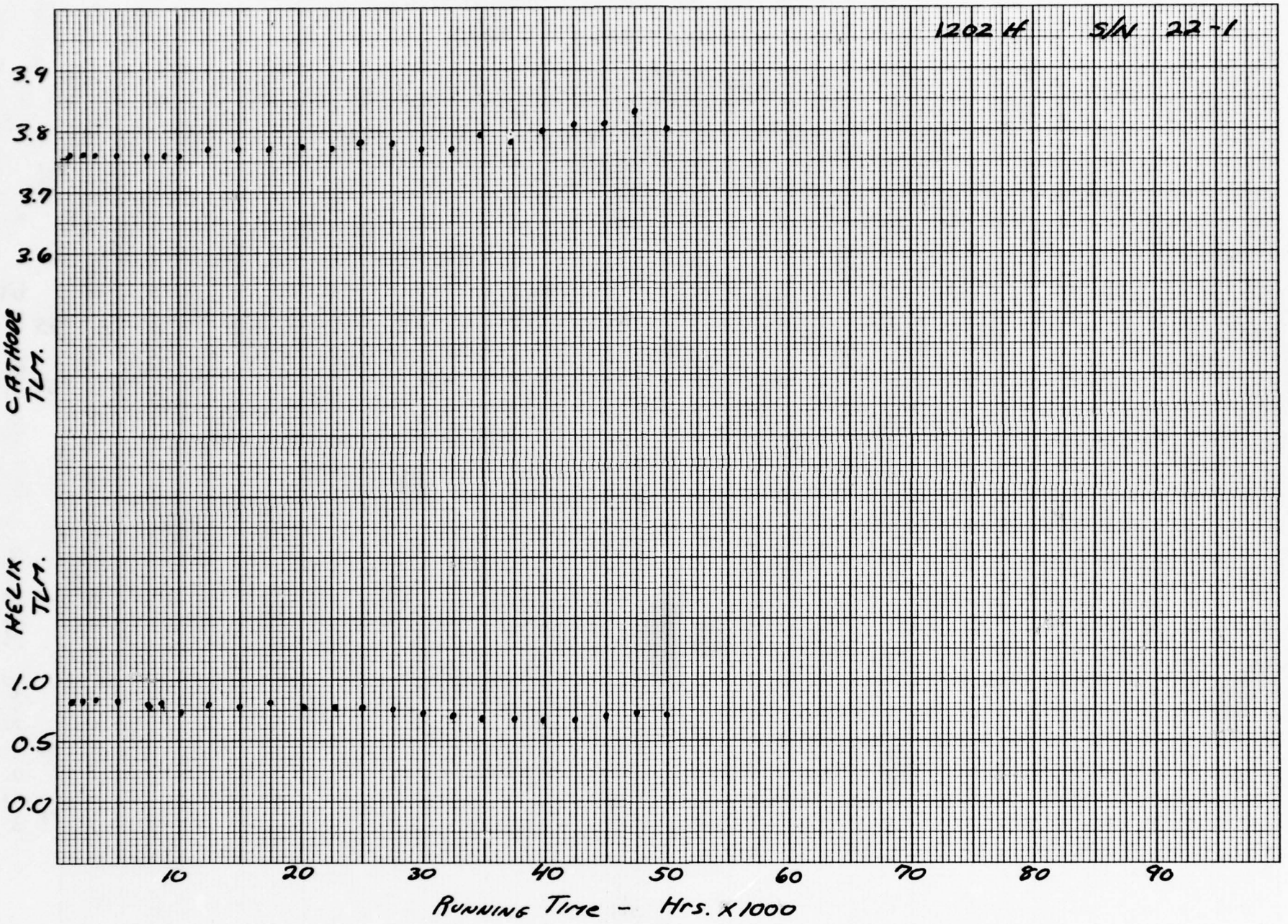



Figure 13 Telemetry data.

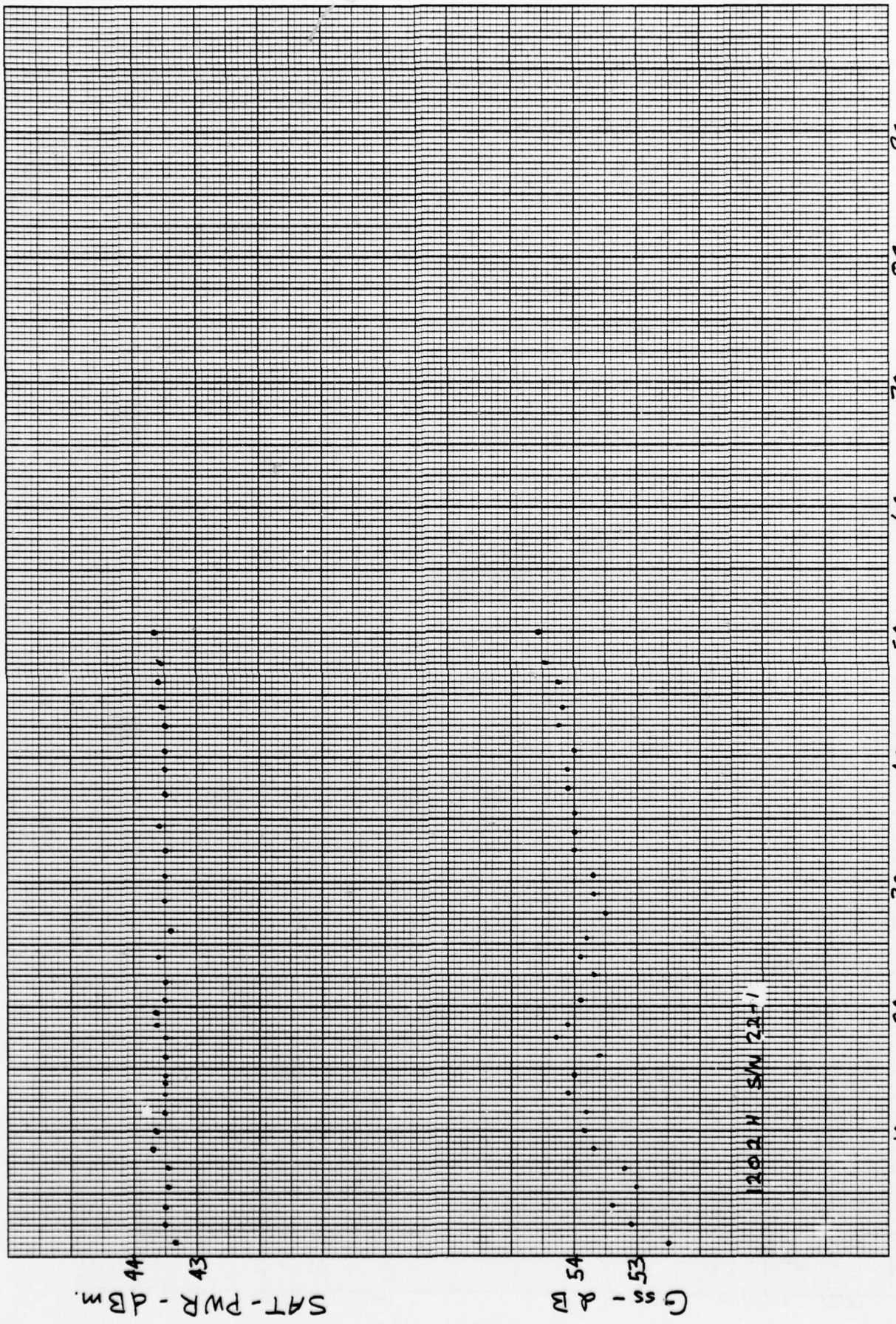



Figure 14 Saturated power and small signal gain.

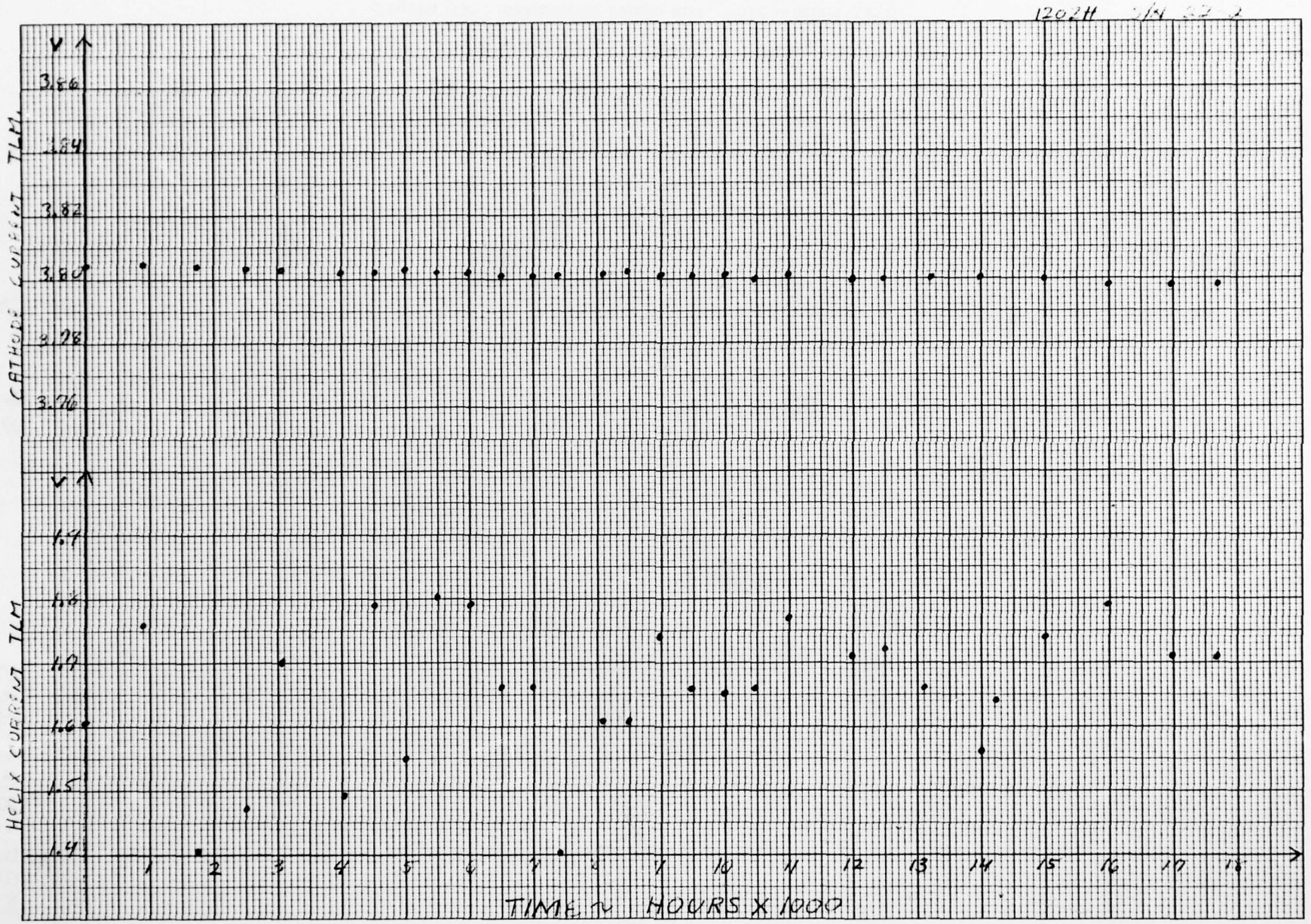



Figure 15 Telemetry data.

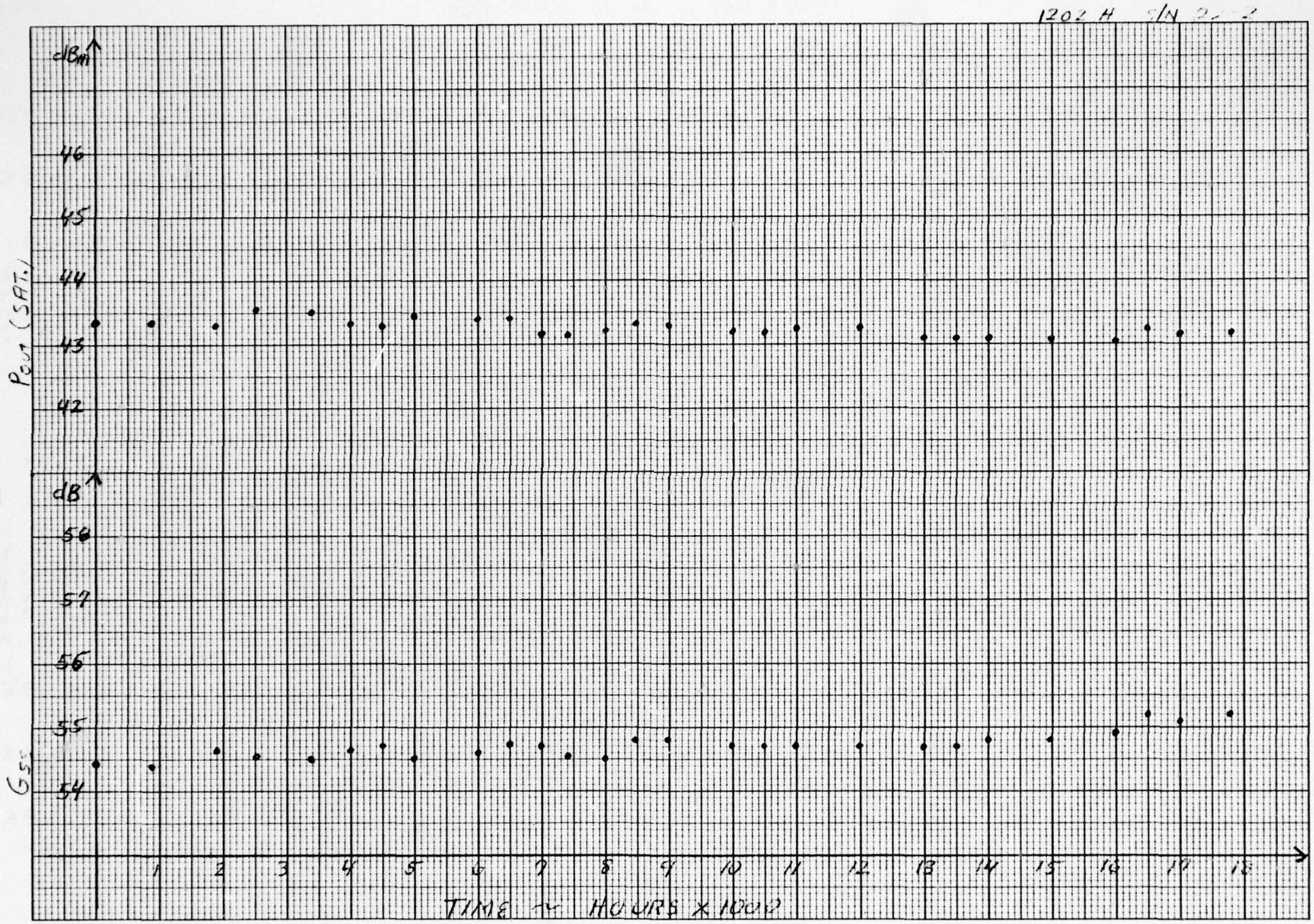



Figure 16 Saturated power and small signal gain.

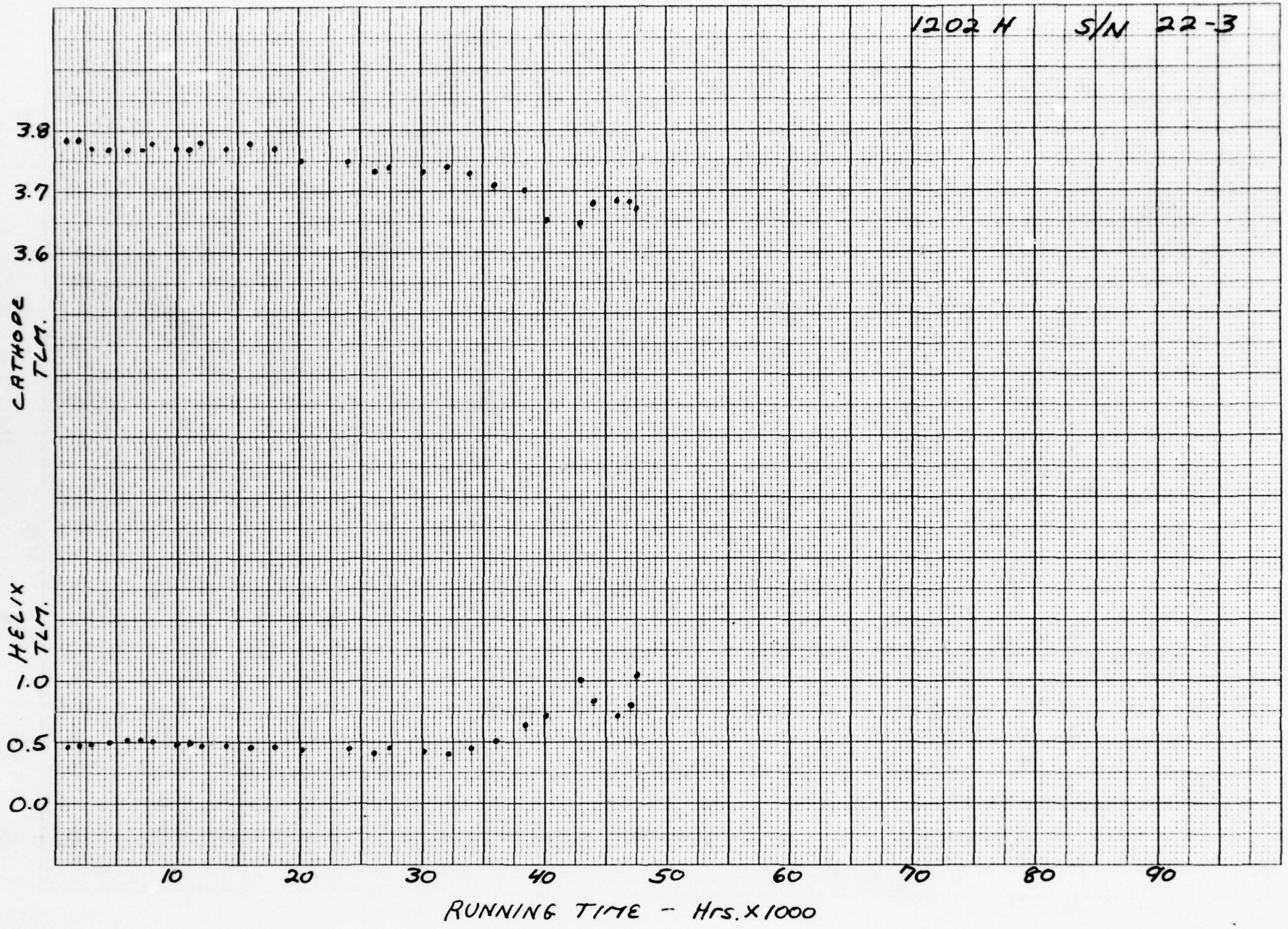



Figure 17 Telemetry data.

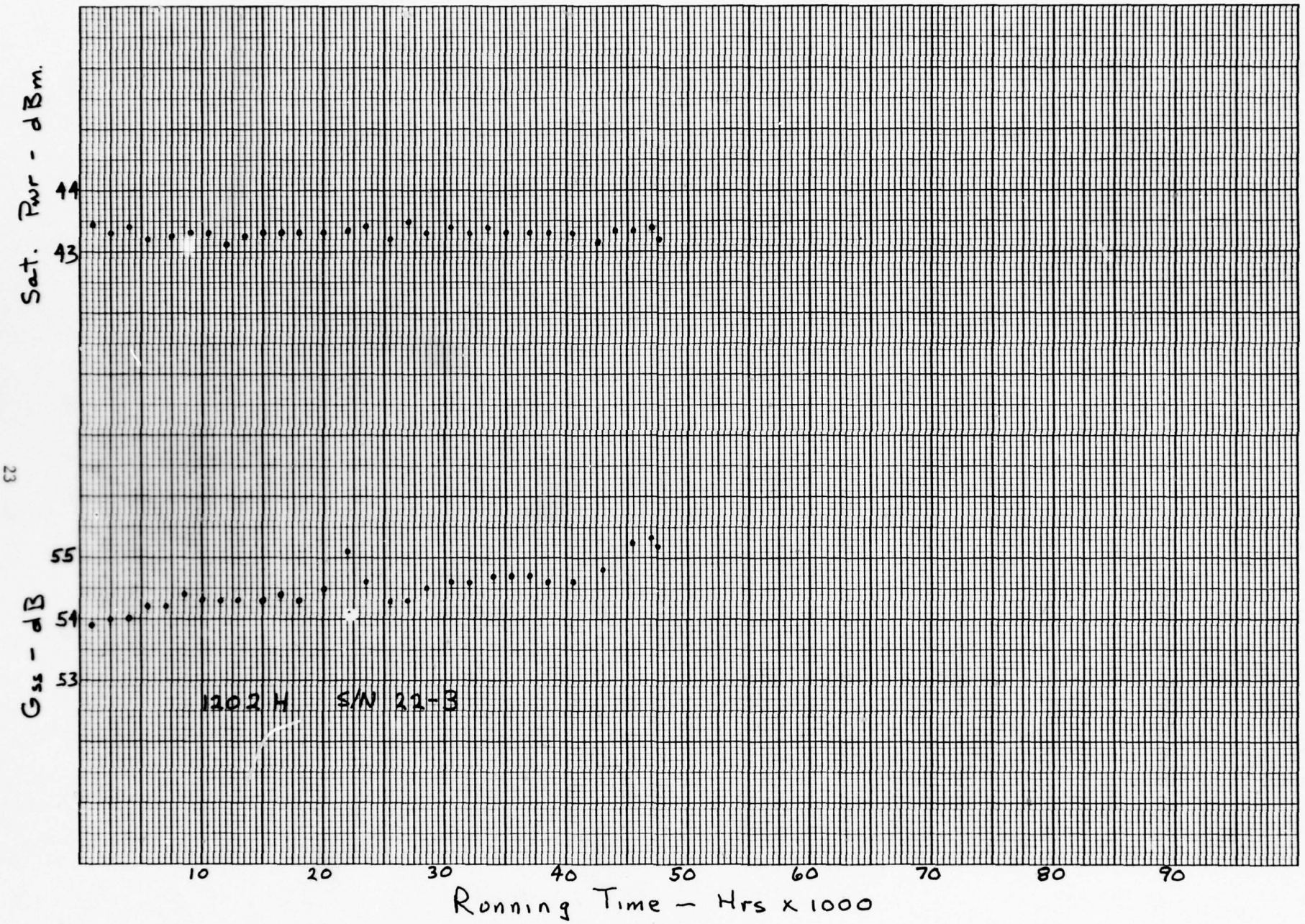



Figure 18 Saturated power and small signal gain.

## 6.3 Discussion of Data

Figure 4 is a summary of the data of Appendix D. It shows the maximum and minimum values of each parameter for each serialized unit, and notes significant events.

The most significant event was the failure of High Level TWTA B200350-122 Serial Number 22-2 after 18,048 high voltage hours of operation. This failure is analyzed in Malfunction Report 2867, Appendix A.

This High Level TWTA failure was caused by the heat from spot-welding, alloying and reducing the heater wire cross sectional area. This reduced area caused excessive heating during operation with subsequent failure at this high resistance point.

Additionally, Serial Number 22-3 failed after 48,307 high voltage hours of operation. Cause of this failure is currently under investigation.

Figure 3 shows that the High Level Small Signal Gain, $G_{ss}$, drifted out of the specification limit, high in all cases, starting out of the limit in the cases of Serial Numbers 12-3 and 22-3. Data shown in Figure 4 shows that for all units, the percent change was small, + 2.66 percent for S/N 22-3 being the highest.

This drift of the Small Signal Gain did not appear to affect the operation or to be indicative of any malfunction.

Helix Current Telemetry Voltage data indicate large variations in this parameter. This data is plotted graphically in figures 7, 9, 11, 13, 15, and 17 at approximately equal points along a linear time scale and does not indicate significant trends.

Figure 5 shows attenuator resistance increasing with time. While the cause is not known, it is possibly due to an increase in beam size, or a reduction in attenuation, caused at least partially to aging of the pyrolitic carbon. The increase in small signal gain is possibly related to this decrease in attenuation, or insertion loss. Whether these are primary or secondary cause and effects is unknown. Except for the possible tie to insertion loss, there is no other known relationship between attenuator resistance and small signal gain.

Worth noting is that the small signal gain is over the specified limit in all cases, while the highest percentage change in attenuator resistances is in serial numbers 22-2 and 22-3. The apparent intermittence may be an effect of the measuring technique as it requires a careful pin to barrel measurement.

Additionally, S/N 22-1 is out of spec. in both Input and Output VSWR (hot), while S/N 12-2 shows a high VSWR for Output (Hot), and S/N 12-3 shows a high VSWR for Input (Hot). This phenomenon is not indicative of any problem.

Figure 6 shows the Cathode Activity Time characteristics for the six (6) tubes generally decreasing with time except S/N 12-3. The characteristic of S/N 12-2 exhibits a fluctuating form resulting in the current value being just less than the initial value. S/N 12-3 has remained essentially constant over the test period. The remaining tubes show decreasing values over time. Both failed TWTAs exhibited a high rate of change prior to failure.

The remaining parameters do not exhibit a consistency by which significant conclusions can be drawn.

## 6.4 Conclusions

The preceding data shows no conclusive correlation between observed parameters which could indicate incipient failures. This data covers approximately the specified required life. Continuation of the test will probably provide more relevant data from which more valid conclusions could be drawn.

The failure of S/N 22-2 was probably caused by human error during manufacturing. Manufacturing processes are strictly controlled to prevent recurrence of malfunctions.

The failure of S/N 22-3 is under investigation, and the Failure Analysis will be forwarded when available.

The current frequency of test measurements is appropriate. Monthly RF and yearly bench functional tests allow for valid evaluation of all parameters at timely intervals. The monthly tests allow for indications of possible approaching failures. It is not recommended to insert new measurements, or revise measurement techniques at this time. Continuation of the life test process will allow direct correlation of future data to the data base now available.

# APPENDIX A

## 777 MODEL 1202H HIGH LEVEL TWTA

## SERIAL NUMBER 22-2

## MALFUNCTION REPORT 2867

# LIFE TEST FAILURE
# 1202H
# S/N 22-2
# MALFUNCTION REPORT 2867

DECEMBER 1973

HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS DIVISION
3100 WEST LOMITA BOULEVARD
TORRANCE, CALIFORNIA 90509

FAILURE REPORT 1202H, SERIAL NUMBER 22-2

## 1.0 INTRODUCTION

This failure report describes a malfunction of a 1202H Traveling-Wave Tube Amplifier serial number 22-2, which occurred during life test after 18048 high voltage operating hours.

## 2.0 BACKGROUND INFORMATION

Unit was being subjected to life test in accordance with Hughes Aircraft Company's document LTP B200350-400. The test was operating continuously at a baseplate temperature of $90^{o}F \pm 15^{o}F$ in a laboratory environment. Weekly the unit was turned off, transferred to a test station and the following data recorded:

1. All Telemetry
   a) Input Current
   b) Cathode Current
   c) Heater Voltage
   d) Helix Current
   e) Cathode Voltage

2. Saturated RF power out versus frequency

3. Small signal gain versus frequency

## 3.0 DESCRIPTION OF TROUBLE

Unit performance was normal for first 18,048 hours of life test. Unit was on life test rack when it was noticed off as part of daily life test surveillance. Unit was removed from life test rack and upon application of ON command, the unit drew approximately 0.24 A buss input current and heater voltage telemetry was 4.6 V during time out. Indication was that heater circuit was unloaded.

## 4.0 Verification and Analysis

Heater circuit open was confirmed by removal of TWTA cover and the measurement of a heater current of zero during time out. TWT was disconnected electrically from the power supply at the splice block and heater circuit of TWT was measured open. TWT was removed from TWTA chassis and power supply was operated into simulated TWT load and all voltages, currents and other performance was normal and in specifications. No power supply anomalies were noted. A systematic set of failure analysis procedures was outlined to determine the cause of heater failure. An integrated leak test was performed to determine or eliminate the possibility of a leak. The integrated leak test was made using a special fixture that was attached to the gun of the tube. The fixture was pumped out on a leak detector and the pinchoff of the tube was opened with a puncturing device that is part of the fixture. The puncturing device serves a dual purpose: 1) It opens the tube under vacuum to the leak detector; and 2) Once opened the puncturing device serves as a needle valve that allows the tube to be closed or opened to the vacuum of the leak detector.

If a leak exists that is less than the detectable limit of the leak detector, closing the valve of the integrated leak detector fixture allows helium accumulation which effectively increases the detectable limit. No leak was found on 265H S/N 62.

The tube was opened, in a nitrogen filled bag, at the pump-out flange using a tubing cutter. This cut left all heater connections intact. The heater break was found by visual observation at 30X magnification. The break was just beyond the point where the heater leg was spotwelded to the heat shield tab. An electrical continuity check confirmed that there was only one break in the heater. Photographs were taken and the heater was removed for further analysis (see Figures 1 and 2).

Both ends of the heater break were examined using Scanning Electron Microscopy (S.E.M.) (see Figure 3). S.E.M. analysis showed that incipient melting had occurred at the grain boundaries in the area of the break. Energy levels are highest at the grain boundaries and melting can be expected to occur at the grain boundary triple points. There was evidence that some grains of the heater leg may have fallen out leaving a ring or constricted area near the point where separation occurred. A large, equiaxed grain structure was observed at the point of separation, and a sharp transition to a normal wrought tungsten grain structure (nonequiaxed, elongated grains) was observed on the heater side of the separation (see Figure 4). The grain structure of the heater leg on the tab side of the separation could not be seen by S.E.M. analysis.

The tab weld side of the heater leg separation and the heater coil were mounted and examined metallographically. The intent of the cross-sectioning was to determine if the heater leg break was caused primarily by the effects of the adjacent spotweld. A metallographic examination of the area from the spotweld to the point of separation could show if the heat affected zone extended from the spotweld to the separation. This would be indicated by a continuous area of large grains in the heater leg from the spotweld to the point of separation. A transition in the recrystallized grain structure to a wrought structure would indicate that the primary cause of failure was independent of the spotweld and could have been caused by a damaged or imperfect heater leg.

It was recognized that metallographic preparation of a 0.003 inch diameter heater lead would be extremely difficult. Examination of the initial metallographic sections failed to establish any relationship between the spotweld and failure because the only tungsten microstructure appeared on the side of the nickel tab opposite to where the break occurred (see Figure 5). No evidence of tungsten under the tab was found even when the sample was sectioned beyond the point where the end of the heater

wire had previously been visible (Figure 6). The conclusion drawn from this data was that the area of interest had been missed or lost in the first section.

When a review of the metallographic cross sections and S.E.M. photomicrographs was made, correlations between the two became difficult. This review introduced the possibility that the angle of the sample in relation to the plane of the section may have been such that the area of interest had not been reached (see Figure 7). Further sectioning and comparison to S.E.M. photomicrographs revealed that this was true. Several etches were used in an attempt to bring out a tungsten microstructure, but none were successful. Positive identification of the failure point was made by comparison of topography of the cross-section and S.E.M. photomicrographs (see Figure 8). The primary cause of the failure was the spotweld. The tungsten and nickel had alloyed and formed a connection which resulted sometime in a connection approximately one-half the diameter of the original heater leg. This created a hot spot that would continue to weaken the lead by promoting incipient melting, vaporization and a change in the lead diameter until failure occurred.

For comparison, the heater from a tube that had not failed (265H S/N 213) was examined in the same manner. There was no difficulty in distinguishing the tungsten microstructure from that of the nickel. The diameter of the heater leg wire was not reduced by the spotweld. The heater leg was broken in handling prior to mounting and sectioning, but the weld was unaffected. Alloying was limited to the surface interfaces of the tungsten and nickel (see Figures 9 and 10).

In conclusion, 265H S/N 62 failed bacause of an open heater leg at a point adjacent to where it was spotwelded to the heat shield tab. It was determined from metallographic cross sections that too much heat was applied in the spotwelding operation causing complete alloying of the tungsten heater leg and nickel tabs. A 50 percent reduction in heater leg diameter accompanied the alloying which caused a high resistance point which finally failed.

## 5.0 Failure Recurrence Correction

A program has been initiated wherein the Hughes EDD Materials and Process Engineering Department will reevaluate current weld procedures and inspection criteria. Upon completion of their reevaluation, weld requirements will be documented in the form of a specification (MPS) which will include technical requirements and quality assurance provisions. These documents will require a period of instruction and certification by test of all personnel making welds on space tubes at Hughes EDD.

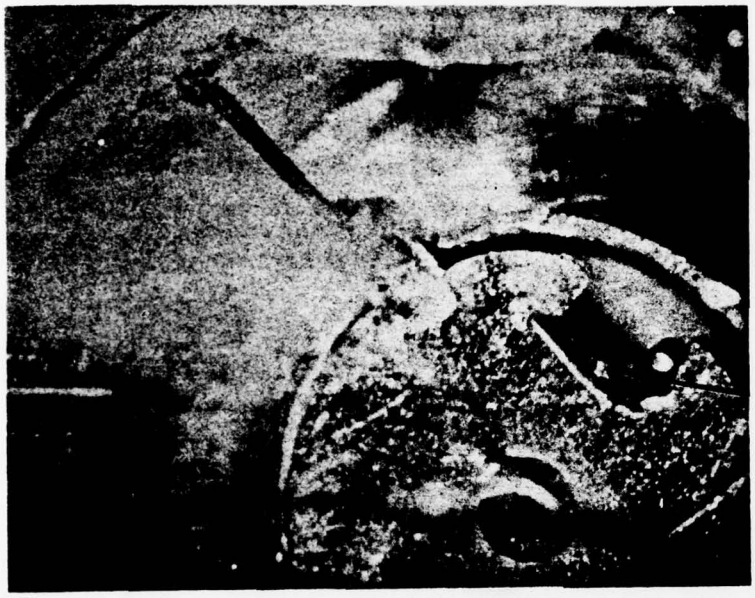


Figure 1
Break in heater leg as observed when tube was opened. Mag. approximately 30X.

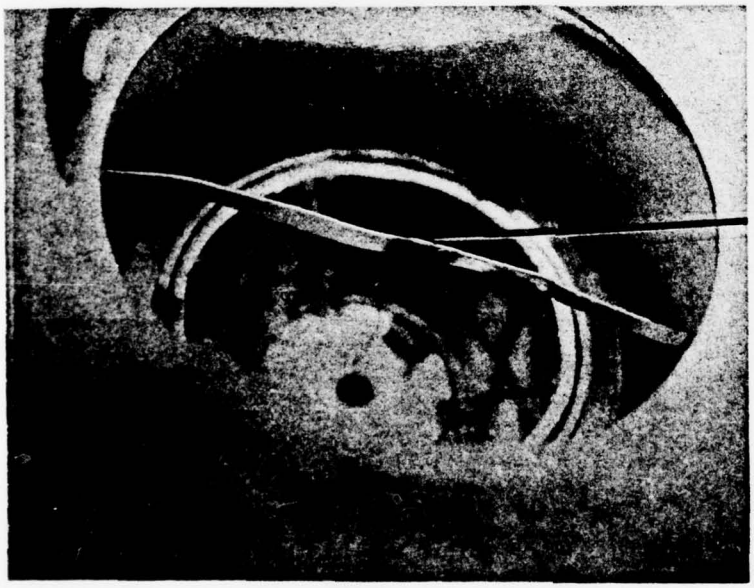
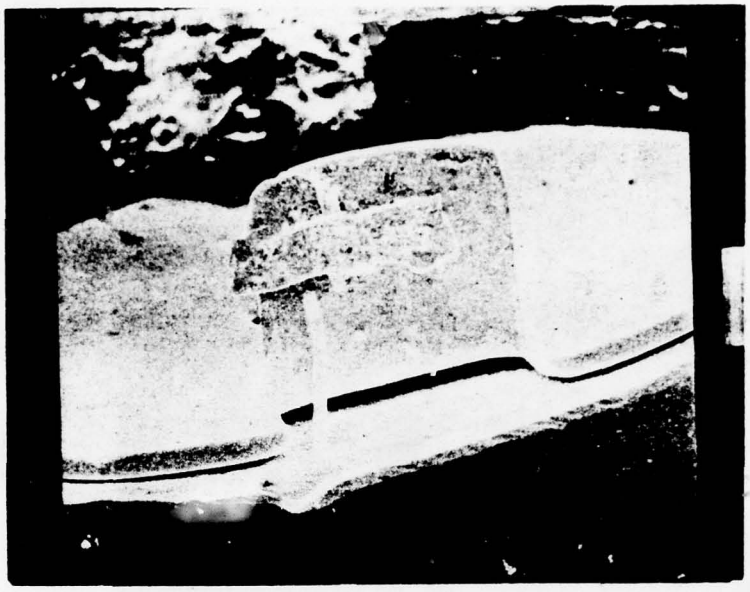


Figure 2
Ground connection of heater lead shown intact. Mag. approximately 7X.

A



B

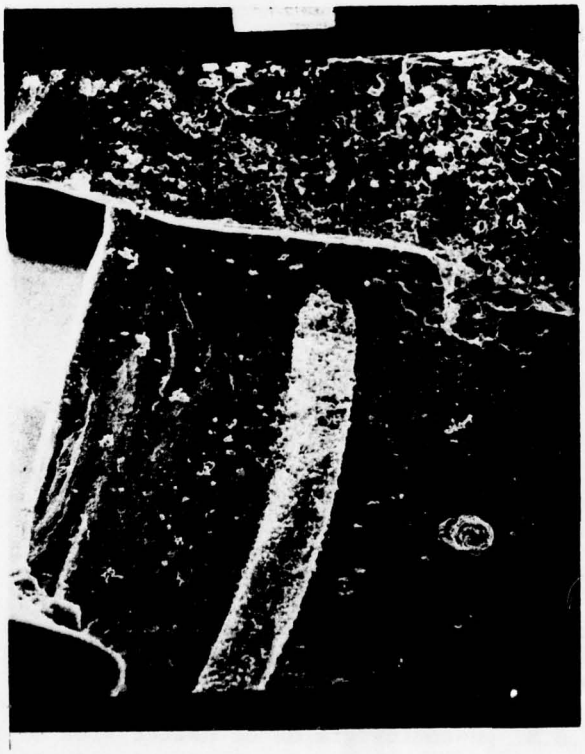
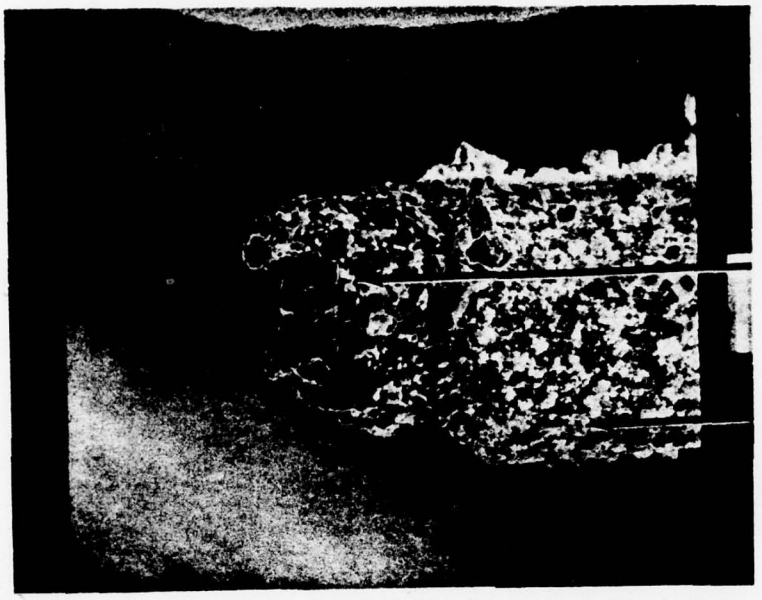


Figure 3 Heater break as viewed with the aid of S.E.M. Mag. 30X and 120X.

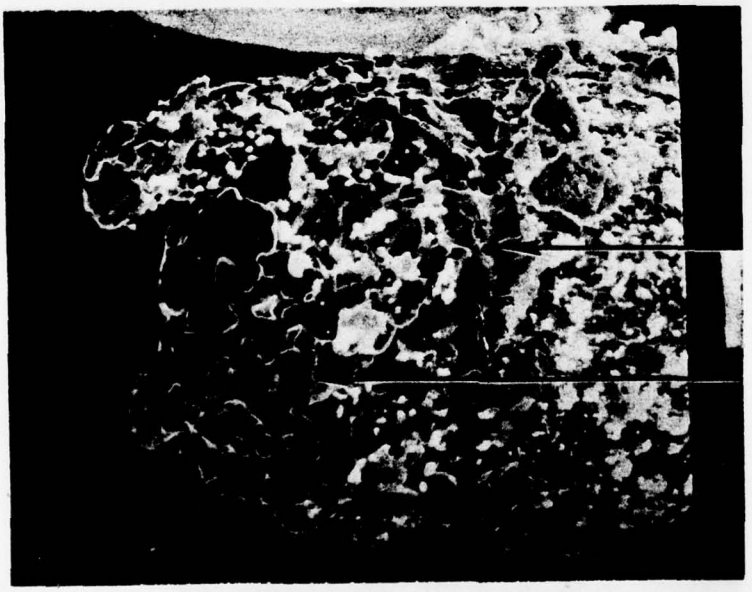
A



Area of large equiaxed grain structure

Area of wrought tungsten structure

B



Constricted area

Insipient melting at the grain boundaries

Figure 4 S.E.M. photomicrographs of heater side of failure showing transition in grain structure and reduction in wire diameter. Mag. 600X and 1200X.

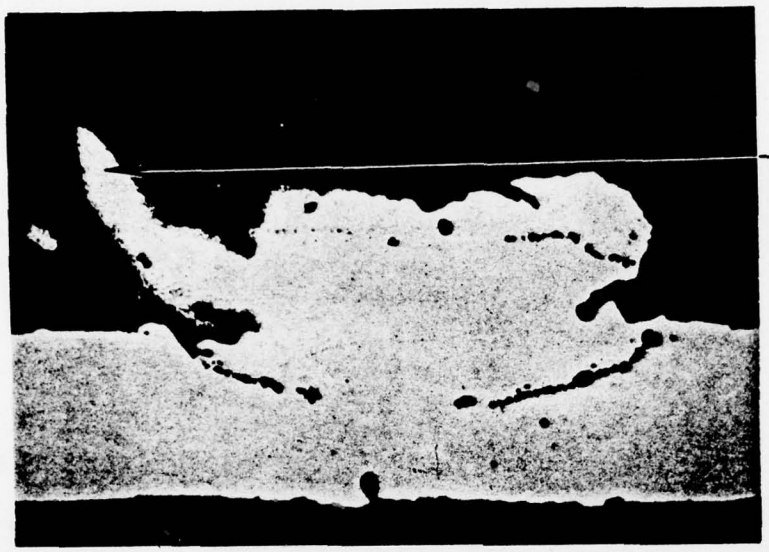



Figure 5 First cross section of heater leg spotweld. Break not visible in this section. Tungsten microstructure evident only in heater leg on opposite side of tab. Mag. 200X.

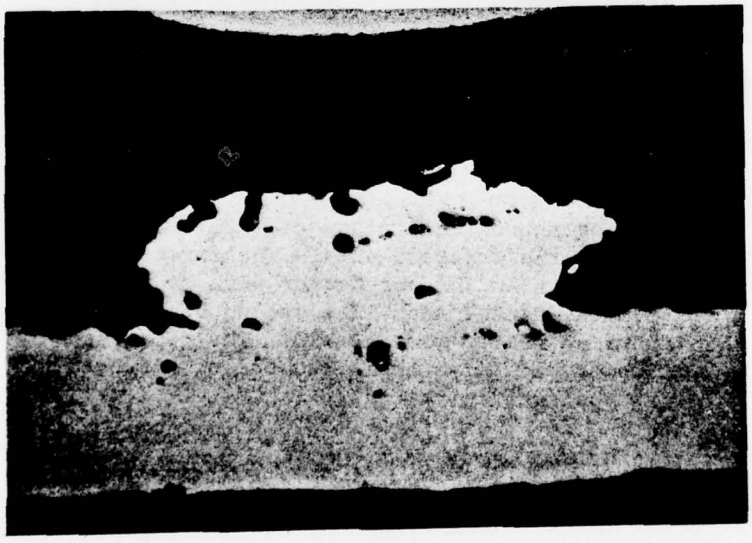


Figure 6 Second cross section of heater leg spotweld. No tungsten microstructure evident. Mag. 200X.

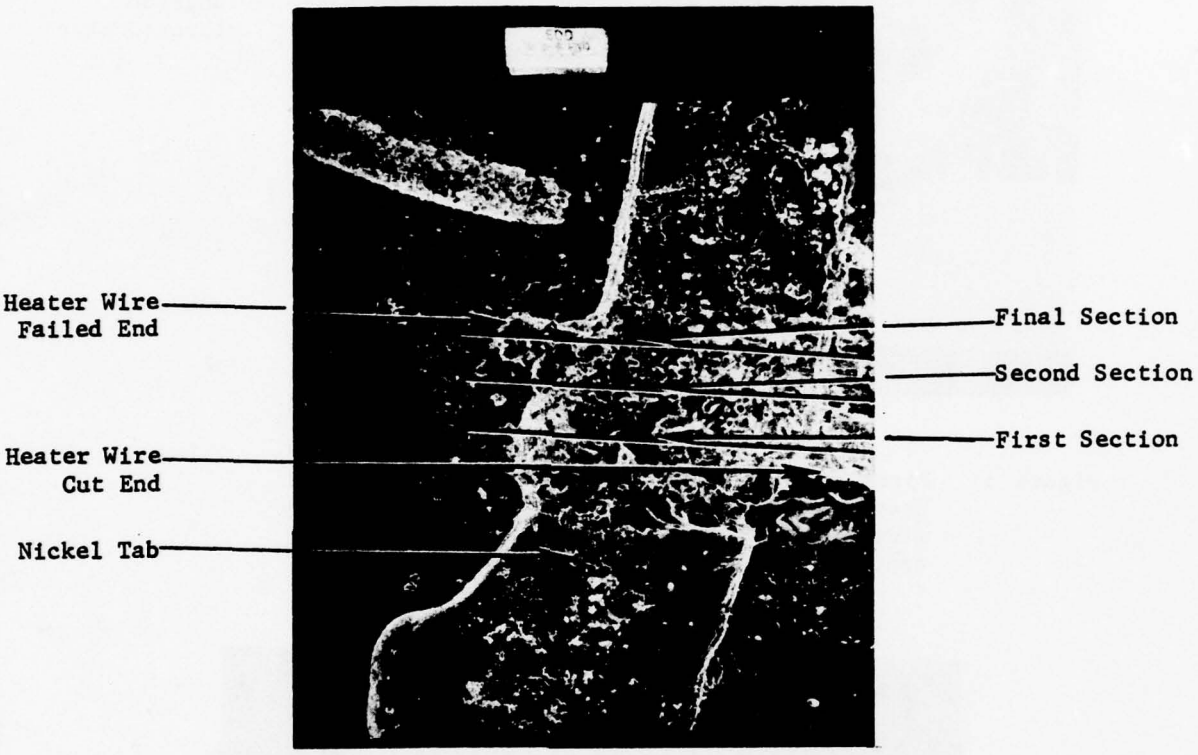
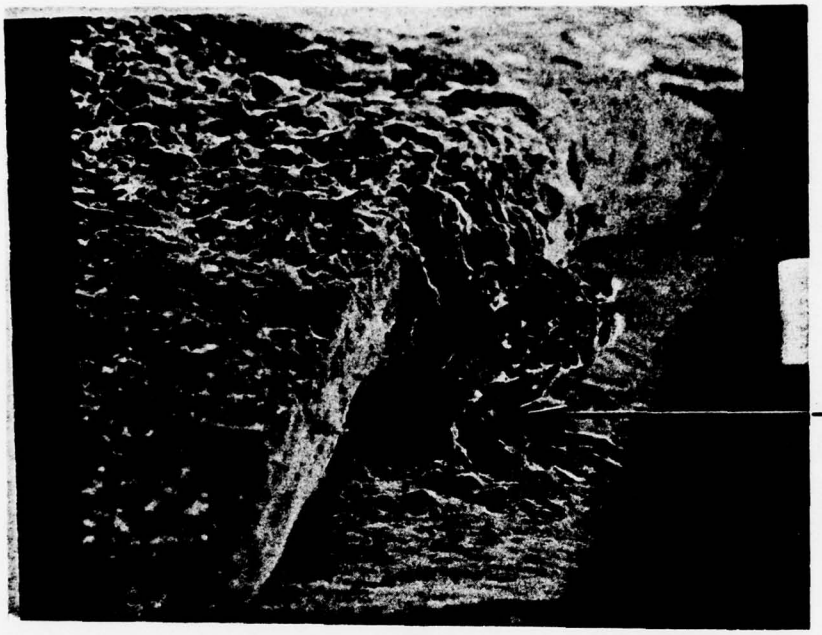
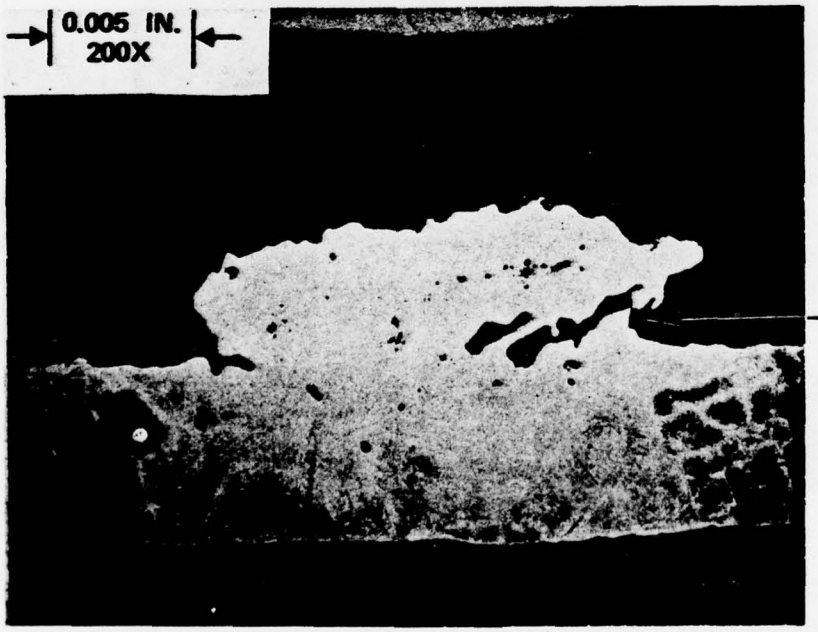



Figure 7
Showing approximate plane of each section through the spotweld area. The first section showed cut end of the heater wire protruding from the nickel tab. The second section shows no heater wire at all. The final section showed only the failed end of heater wire protruding from the tab.



(A) Mag. 300X

Topography
of melt area




(B) Mag. 200X

Topography
of melt area

Figure 8 Comparison of S.E.M. and photomicrographs showing similar topographical features in spotweld melt area.

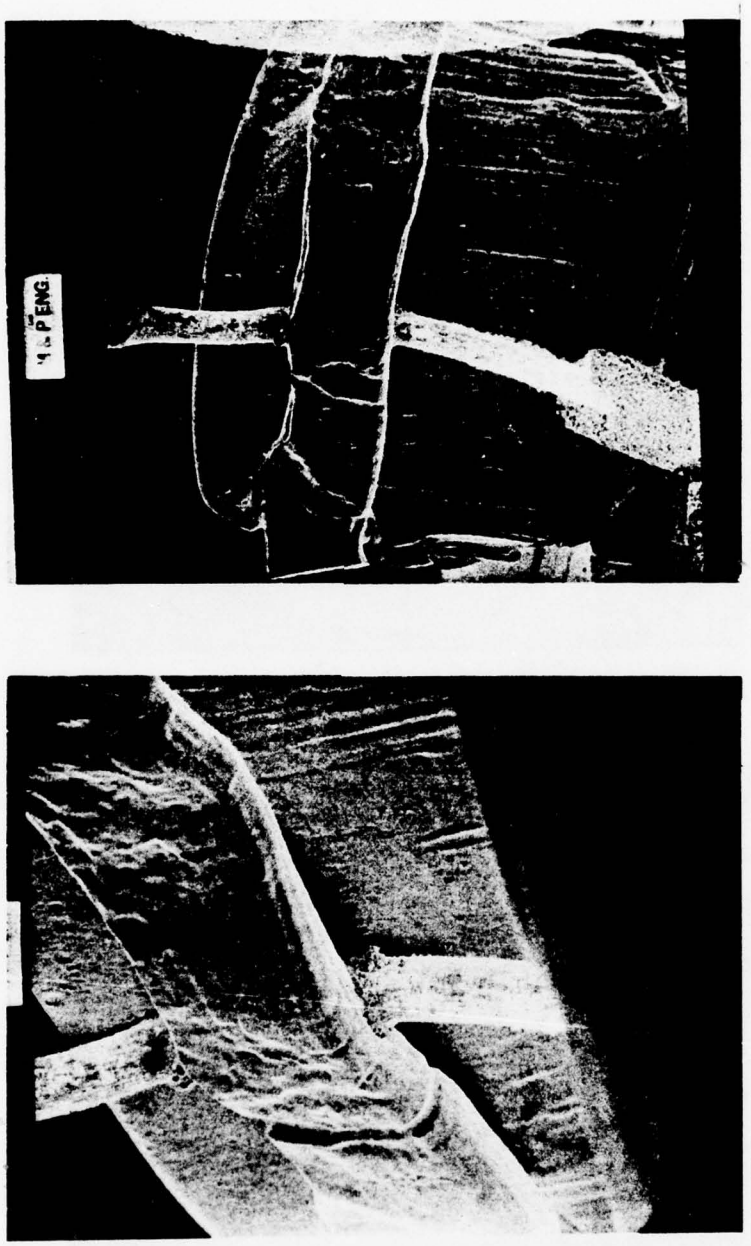
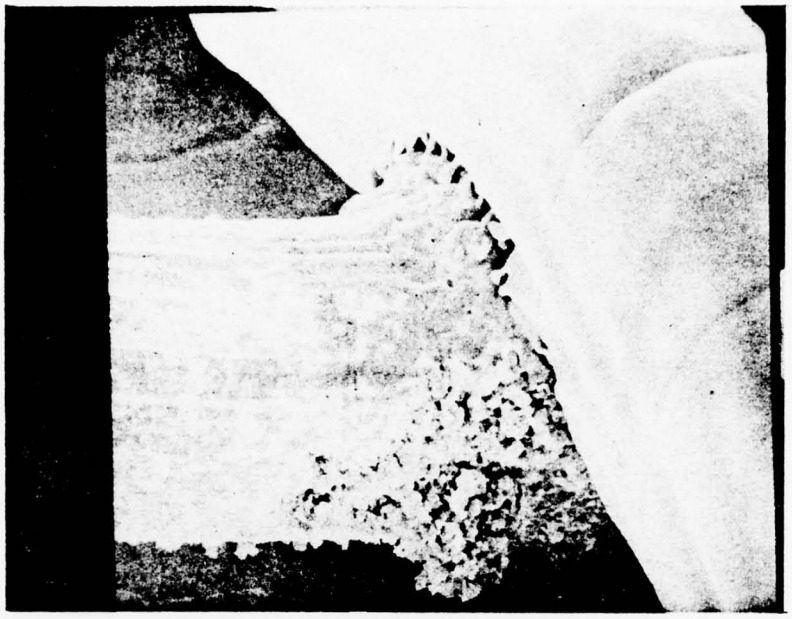
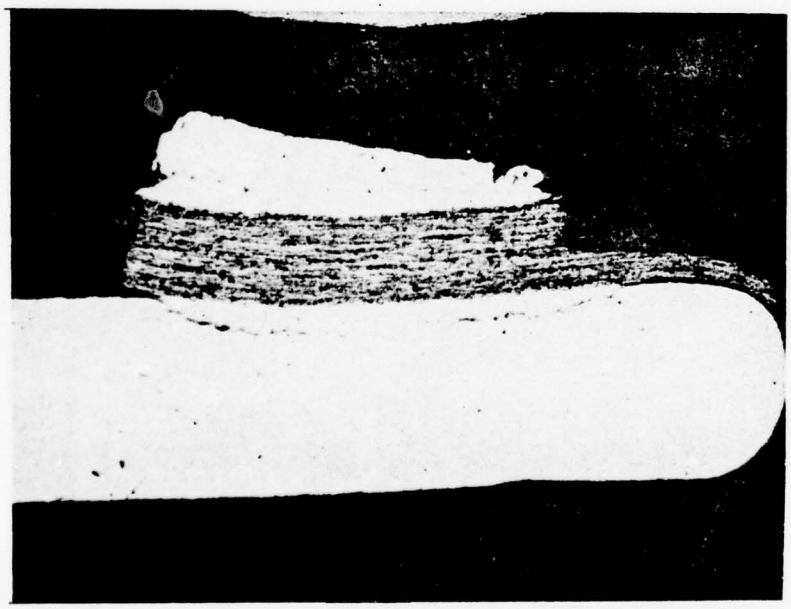


Figure 9 S.E.M. photomicrographs of heater spotweld from 265H S/N 213.



(A) Mag. 600X



(B) Mag. 200X

Tungsten Micro-structure

Figure 10 S.E.M. photomicrograph (A) and metallographic cross section (B) showing minimum of alloying of nickel with tungsten.

APPENDIX B

777 MODEL 1202H HIGH LEVEL TWTA

LIFE TEST PLAN AND PROCEDURE

LTP B200350-400

| REVISIONS | | | APPROVED | | | |
|---|---|---|---|---|---|---|
| DATE | LTR | DESCRIPTION | QA | ENG | MFG | REL |
| 3/26/74 | A | Completely Revised: WAS: SEE HISTORIC FILE<br>IS: PAGES 2 THROUGH 38<br>Per E.C.N. A8323, A8379 & A14895 | | | | G.C.L. |

| RELEASED PRINT ENG DOC CONTROL CTR | A REV | 3-27-74 REL DATE | JK REL BY |
|---|---|---|---|

| | |
|---|---|
| END USE | B200350-12X |
| PREP BY | D. W. Schaffer |
| QA | |
| ENG | 21 JAN 74 |
| MFG | |
| REL | 21 JAN 74 |
| DATE OF ISSUE | |

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

# 777 HIGH LEVEL TWTA LIFE TEST PLAN AND PROCEDURE

| SIZE | CODE IDENT NO. | |
|---|---|---|
| A | 73293 | LTP B200350-400 |
| | REV A | SHEET 1 OF 37 |

EDD-1047A-1272

LIFE TEST PLAN FOR

777 TRAVELING-WAVE TUBE AMPLIFIERS

1.0 SCOPE

1.1 General

This life test plan establishes the requirements for the life test of the Traveling-Wave Tube Amplifiers.

2.0 APPLICABLE DOCUMENTS

2.1 The following documents, of the latest issue in effect, unless otherwise specified, form a part of this test plan to the extent specified herein:

Specification

TRW

| | |
|---|---|
| 777-777 | Statement of Work, High Level Traveling-Wave Tube Amplifier, Project 777. |
| EC-EQ4-664 | Detail Specification, High Level Traveling-Wave Tube Amplifier (HL TWTA) for Project 777. |
| PAR 700-45-D-2 | Subcontractor Product Integrity Requirements, Project 777. |
| 777-S1-2831<br>70-2376-RV-616 | Life Test Negotiations (amends 777-778). |
| 777-G31-80A | Statement of Work, Traveling-Wave Tube Amplifier Life Test Extension, Program 777 3 July 1973. |

HUGHES/EDD

| | |
|---|---|
| B200350-121 | TWTA Assembly, Model 1202H-1 |
| B200350-122 | TWTA Assembly, Model 1202H-2 |
| B200429-100 | Life Test Assembly |
| ATPB200350-400 | Acceptance Test Procedure TWTA, High Level |

## 3.0 REQUIREMENTS

### 3.1 Purpose

The life test described herein is for the purpose of determining the conformance of the TWTA to life test requirements in accordance with 777-777.

### 3.2 Items Tested

The life tests described herein are to be conducted on six high level TWTA's, three each of two frequency bands. The assigned identification for the units are:

| Description | Part No. | S/N | Frequency Band |
|---|---|---|---|
| HL Life Test Unit | B200350-121 | 12-1 | K |
| HL Life Test Unit | B200350-121 | 12-2 | K |
| HL Life Test Unit | B200350-121 | 12-3 | K |
| HL Life Test Unit | B200350-122 | 22-1 | L |
| HL Life Test Unit | B200350-122 | 22-2 | L |
| HL Life Test Unit | B200350-122 | 22-3 | L |

### 3.3 Test Equipment

#### 3.3.1 Life Test Set

The TWTA life test shall consist of special test equipment and commercial equipment as defined in Hughes/EDD Drawing B200429, Life Test Assembly.

### 3.4 General Requirements

#### 3.4.1 Test Environment

The test environment will be nominal operating laboratory conditions.

##### 3.4.1.1 Room Temperature

The TWTA shall be exposed to an ambient room temperature of 75 $\pm$ 5°F.

##### 3.4.1.2 Cold Plate Temperature

The TWTA cold plate temperature shall be maintained at 90 $\pm$ 15°F. Preconvection, forced air, or water cooling will be used to maintain the cold plate temperature.

##### 3.4.1.3 Relative Humidity

The relative humidity will be 90% or less.

3.4.1.4 Barometric Pressure

The barometric pressure will be the prevailing laboratory pressure.

3.4.2 Performance

During the life test, the functional operation and performance of the TWTA will be recorded. If the value of any measured parameter is not within tolerance, a test discrepancy shall be recorded and an appropriate failure classification and resulting failure action shall be determined in accordance with 3.6. The test discrepancy shall be recorded on the form shown in Figure 7.

3.4.2.1 Monthly Performance Measurements

Once every month the TWTA's will be subjected to the following performance tests and shall meet the appropriate requirements of EC-EQ4-664 (see paragraphs 4.2 and 4.3).

a. All telemetry parameters
b. Small signal gain
c. RF power output at saturation
d. TWT attenuator insertion loss
e. TWT attenuator input and output d.c. resistance

3.4.2.2 Bench Functional Tests

Each TWTA will be tested per paragraph 4.0 of the Acceptance Test Procedure TWTA, High Level, ATP B200350-400. Each TWTA will undergo bench functional test at 20,000 ±500 hours and at termination of its extended life test. (See paragraph 4.4.)

3.4.2.3 Cathode Activity Tests

Cathode activity tests shall be run the first month of high voltage operation, and at the end of each three month period and the last month of the life test. The measurements shall be made in July and October 1973 and January, April and July 1974.

3.4.3 Assembly Calibration

3.4.3.1 Life Test Set

All critical measurement equipment shall have been calibrated. Hughes/EDD system of calibration for for test and measurement equipment complies with the requirements of MIL-C-45662A.

3.5 Completion of Life Test

The extended life test for each TWTA will be terminated 31 July 1974.

3.6 Failures

3.6.1 Test Discrepancies

At any time during the life testing of the TWTA's that a discrepancy is noted, the test shall be stopped on that unit and the responsible Reliability Project Engineer is to be notified. At this time additional testing may be performed to ascertain the nature of the discrepancy and establish the necessary actions to be taken.

3.6.2 Failure Definition

Failure is defined as the inability of the TWTA to meet the performance requirements of tests specified in paragraph 3.4.2.

3.6.3 Failure Action

In the event of a TWTA malfunction, that unit will be removed from the life test station and a malfunction notification will be submitted by TWX to TRW within 48 hours of the occurrence. Life testing will be continued on the remaining units. Failure analysis will be performed to determine the cause of the failure; however, permission to perform the teardown which would be required for failure analysis will be obtained from TRW. A failure analysis report will be issued within seven days after the failure cause has been determined. Repair action, disposition and additional testing of the failed TWTA are not within the scope of this life test.

3.7 Test Records

Test results of the life testing of the TWTA shall be recorded and maintained consistent with the requirements specified herein.

3.7.1 Test Log

The test data resulting from the life tests shall be recorded on reproducible copies of test data sheets. All entries made during the life test must be in ink. Deletions and/or corrections to the data sheets shall be made by ruling out the appropriate portions of the test data and inserting the corrections. Ruled out data must remain legible and be signed and dated by the person making the correction. Completed data sheets shall be signed by the Reliability Project Engineer.

3.7.2 Variation

Any variation from these procedures shall be recorded in detail on the variations page of the test log. The form shown in Figure 8 shall be used as the variations page.

3.7.3 Test Reports

Summary status reports shall be submitted quarterly as part of the Quarterly Life Test Review. A final life test report will be submitted to TRW within 45 days after completion of the life test.

3.7.4 Data Review

Quarterly review meetings will be held between TRW and HAC to discuss life test status, performance and data trends.

3.8 Plug Savers

Plug savers shall be used on the RF connectors and power connector at all times during life testing of the TWTA, except where critical test measurements are affected. (Does not apply to cathode activity connectors.)

3.9 Frequency Designations

The frequencies of test, relative to band limits, are designated as follows:

3.9.1 K Band (-1)

| | | |
|---|---|---|
| $f_3$ | Low End Useful Band | 7127 MHz |
| $f_1$ | Low End Operating Band | 7250 MHz |
| $f_0$ | Center Operating Band | 7350 MHz |
| $f_2$ | High End Operating Band | 7450 MHz |
| $f_4$ | High End Useful Band | 7500 MHz |

3.9.2 L Band (-2)

| | | |
|---|---|---|
| $f_3$ | Low End Useful Band | 7305 MHz |
| $f_1$ | Low End Operating Band | 7490 MHz |
| $f_0$ | Center Operating Band | 7620 MHz |
| $f_2$ | High End Operating Band | 7750 MHz |
| $f_4$ | High End Useful Band | 7860 MHz |

## 4.0 TEST PROCEDURE

### 4.1 Test Setup for Extended Life Test

The test setup shall be maintained in the original configuration after completion of the first phase of life testing.

4.1.1 Connect the TWTA as outlined in the test setup configuration shown in B200429-800.

4.1.2 Apply input voltage (28 $\pm$.25 Vdc). Depress and release start switch.

4.1.3 Apply nominal RF input drive.

4.1.4 Apply the command signal (5 $\pm$.25 Vdc). The TWTA shall turn on and RF output power shall be present as well as telemetry outputs.

4.1.5 Remove the command signal and the TWTA shall shut off.

4.1.6 Remove the power meter, thermistor mount, attenuator, and D.V.M. Connect the TWTA load as shown in B200429-800.

4.1.7 Repeat steps 4.1.1 through 4.1.6 as each TWTA is installed on the test console.

### 4.2 Telemetry Measurements - Monthly

Once every month, measure the telemetry output voltages specified below; and record the data on the data sheet shown in Figure 5.

| Telemetry Output | Limits |
|---|---|
| Heater Voltage Telemetry Voltage | 0 to 5.12 Vdc* |
| Cathode Current Telemetry Voltage | 0 to 5.12 Vdc* |
| Cathode Voltage Telemetry Voltage | 0 to 5.12 Vdc* |
| Helix Current Telemetry Voltage | 0 to 5.12 Vdc* |
| Input Current Telemetry Voltage | 0 to 5.12 Vdc* |

*Per Calibration Curves from 1199H ATP.

In addition to recording the telemetry readings, the date of the test, input voltage and the elapsed time must also be recorded.

### 4.3 RF Measurements - Monthly

Once every month, perform the following tests. In addition to recording the test results, the date of the test and the elapsed time for each unit must also be recorded. The data sheets shown in Figure 5 shall be used for data recording.

4.3.1 Small Signal Gain

4.3.1.1 Connect the TWTA as outlined in Figures 1 and 2. Set the sweep oscillator to $f_0$. Insert a 10 db attenuator in the RF input leg.

4.3.1.2 Apply nominal input voltage and command signal to the TWTA. Adjust the RF input drive level to produce a power output at least 10 db below saturation. Using the input and output power calculate the gain at $f_0$. Gain shall be in the range of 49 db to 54 db. Record.

4.3.1.3 Vary the frequency over the band $f_3$ to $4_4$ and adjust the gain of the X-Y recorder to obtain a scale which will contain the small signal gain versus frequency curve. Plot calibration lines at .2 db intervals.

4.3.1.4 Plot small signal gain versus frequency over the band of $f_3$ to $f_4$ indicating the $f_1$, $f_2$, $f_3$ and $f_4$ points.

4.3.1.5 Repeat paragraph 4.3.1.1 through 4.3.1.4 at an input voltage of 23 $\pm$.5 Vdc and 33 $\pm$.5 Vdc. Attach graphs to data sheet.

4.3.2 Saturated Power Output

4.3.2.1 Connect the TWTA as outlined in Figures 1 and 2. Apply nominal DC input voltage (28 $\pm$0.5 Vdc) and command signal (5 $\pm$0.25 Vdc) to the TWTA.

4.3.2.2 Set the sweep oscillator at $f_0$ and adjust the RF input power level for saturated power out.

4.3.2.3 Record telemetry voltages.

4.3.2.4 Vary frequency over the band $f_1$ to $f_2$. Adjust the gain of X-Y recorder to obtain a scale which will contain the saturated power output versus frequency.

4.3.2.5 Plot calibration lines on the graph paper at 0.2 db intervals beginning at 43 dbm, indicating the $f_1$ and $f_2$ points.

4.3.2.6 Plot saturated power output versus frequency over the band. The minimum power output at saturation shall be 27 dbm over the range of $f_1$ to $f_2$. Attach graph to data sheet. Check.

4.3.3 TWT Attenuator Insertion Loss

4.3.3.1 Connect the TWTA as outlined in Figure 4.

4.3.3.2 Adjust the two waveguide attenuators each to 1 db.

4.3.3.3 Set the generator to $f_0$ and adjust the RF input power level until the network analyzer reference channel level meter is approximately mid-scale. Zero the amplitude meter using the test channel gain and amplitude zero controls.

4.3.3.4 Adjust the two waveguide attenuators each to their maximum setting.

4.3.3.5 Replace the unit under test (OUT) by a direct shorting coupler.

4.3.3.6 Adjust the waveguide attenuators until the network analyzer amplitude meter reading is zero. Note: Do not readjust any other controls.

4.3.3.7 Subtract 2 db from the sum of the two waveguide attenuators and record the difference.

4.3.4 TWT Attenuator D.C. Resistance

4.3.4.1 Connect the resistance bridge (Equipment List Item 26) leads together after warm-up and read the shorted lead resistance. Record this value.

4.3.4.2 Connect the resistance bridge leads between the TWTA input R.F. connector center pin and case. Measure the resistance and record $R_{Ai}$ minus the lead resistance recorded in 4.3.4.1.

4.3.4.2 Connect the resistance bridge leads between the TWTA output R.F. connector center pin and case. Measure the resistance and record $R_{Ao}$ minus the lead resistance recorded in 4.4.3.1.

4.4 Bench Function Tests

Test each TWTA per paragraph 4.0 of the Acceptance Test Procedure, ATP B200350-400. Bench tests shall be performed after 20,000 $\pm$500 hours of operation and upon completion of extended life test.

4.5 Cathode Activity Tests - Three Month Intervals

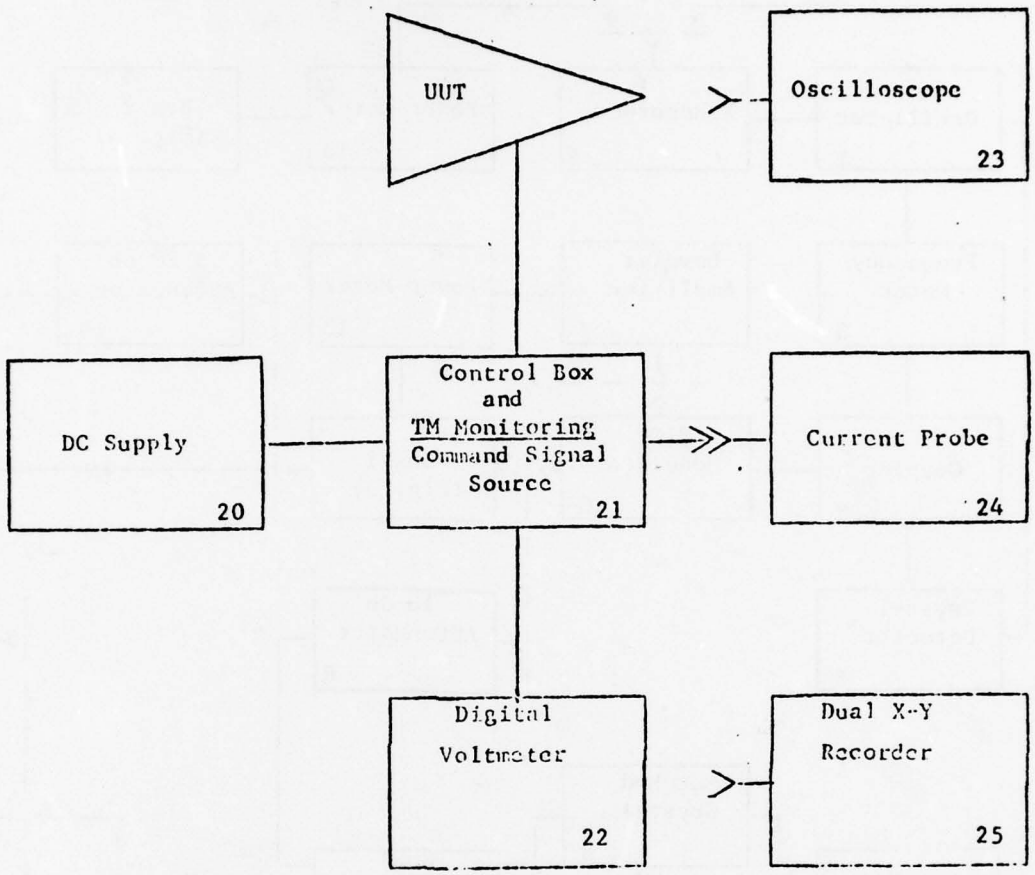
Cathode activity tests shall be run at the time indicated in paragraph 3.4.2.3. In addition to recording the test results, the date of the test and the elapsed time for each unit must be recorded. The data sheets shown in Figure 6 shall be used for recording this data.

4.5.1 Cathode Activity

4.5.1.1 Connect the TWTA as outlined in Figure 1. Apply nominal voltage (28 ±0.5 Vdc) and the command signal (5 ±0.25 Vdc). Allow at least three minutes for stabilization.

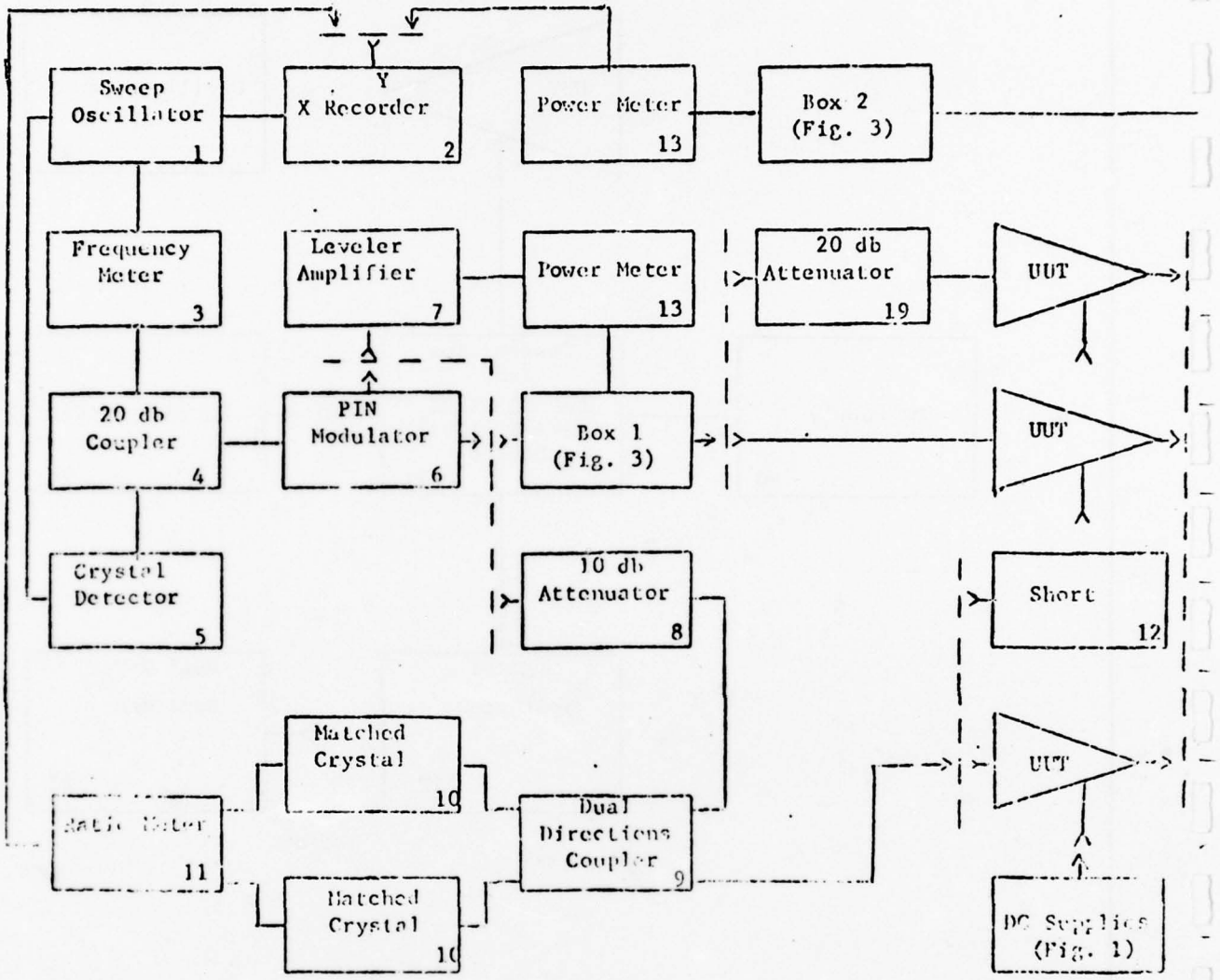
4.5.1.2 Remove heater voltage. Plot cathode and helix current versus time using the telemetry outputs.

4.5.1.3 Using the graph of cathode current versus time, draw two lines, one tangent to the operating point, the other tangent to the slope. The point of intersection of these two lines shall be greater than fifteen (15) seconds. (See Figure 4). Check. Attach curve to data sheets.




SUPPLY A/B CONTROL BLOCK

FIGURE 1




POWER OUTPUT AND GAIN BLOCK

FIGURE 2

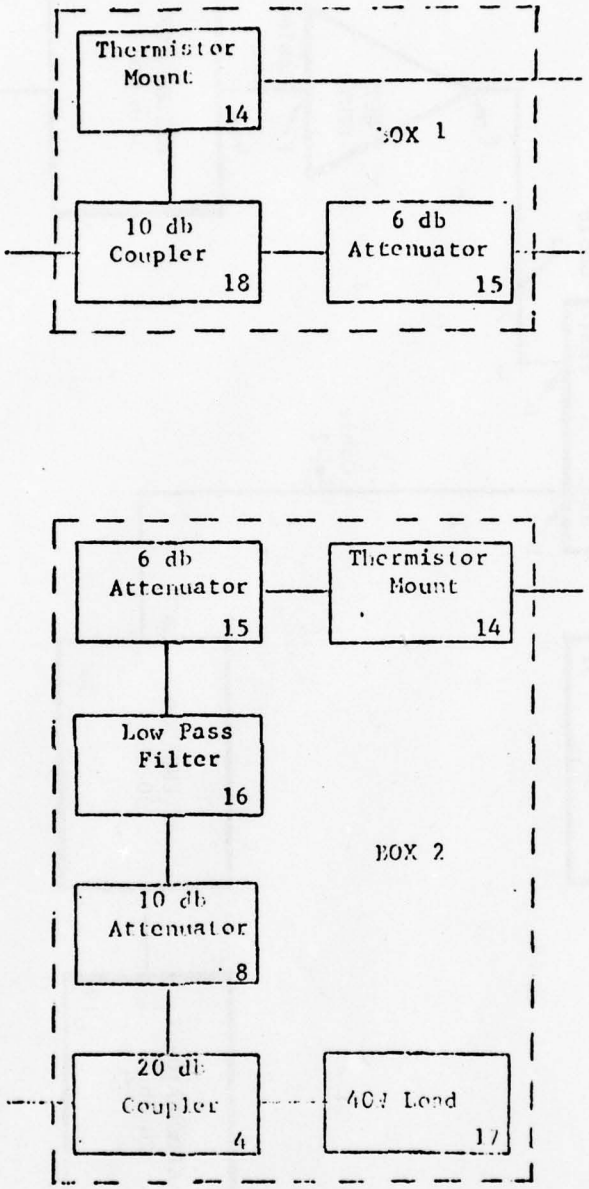
## RF TEST MEASUREMENTS BLOCK DIAGRAMS

LIST OF EQUIPMENT

| | EQUIPMENT | MAKE (OR EQUIVALENT) | MODEL (OR EQUIVALENT) |
|---|---|---|---|
| 1. | Sweep Oscillator | H-P | R.F. Unit H01-8694B, Series 8690 |
| 2. | X-Y Recorder | H-P | 7035B |
| 3. | Frequency Meter | H-P | 537A |
| 4. | 20 db Directional Coupler | Narda | 3045C-20 |
| 5. | Crystal Detector | Alfred | 1001 |
| 6. | PIN Modulator | H-P | 8734A |
| 7. | Invertor & Leveler Amplifier | HAC | |
| 8. | 10db Attenuator | Narda | 774-10 |
| 9. | Dual Directional Coupler | Narda | 3024 |
| 10. | Crystal | Alfred | 1001 Opti |
| 11. | Ratio Meter | H-P | 416B |
| 12. | Short (female) | Narda | |
| 13. | Power Meter | H-P | 432A |
| 14. | Thermistor Mount | H-P | 478A |
| 15. | 6 db Attenuator | Narda | 757C-6 |
| 16. | Low Pass Filter | Microlab | LA-80N |
| 17. | High Power Load | Narda | 376NM |
| 18. | 10 db Directional Coupler | Narda | 3034B-10 |
| 19. | 20 db Attenuator | Narda | 777C-20 |
| 20. | DC Power Supply | Lambda | LA343M |
| 21. | Control Box | HAC | |
| 22. | Digital Voltmeter | Fairchild | 7000-OPT-1 |
| 23. | Oscilloscope | Tektronix | 531A |
| 24. | Current Probe | Tektronix | P6042 |
| 25. | Dual X-Y Recorder | H-P | 136A |

LIST OF EQUIPMENT Continued

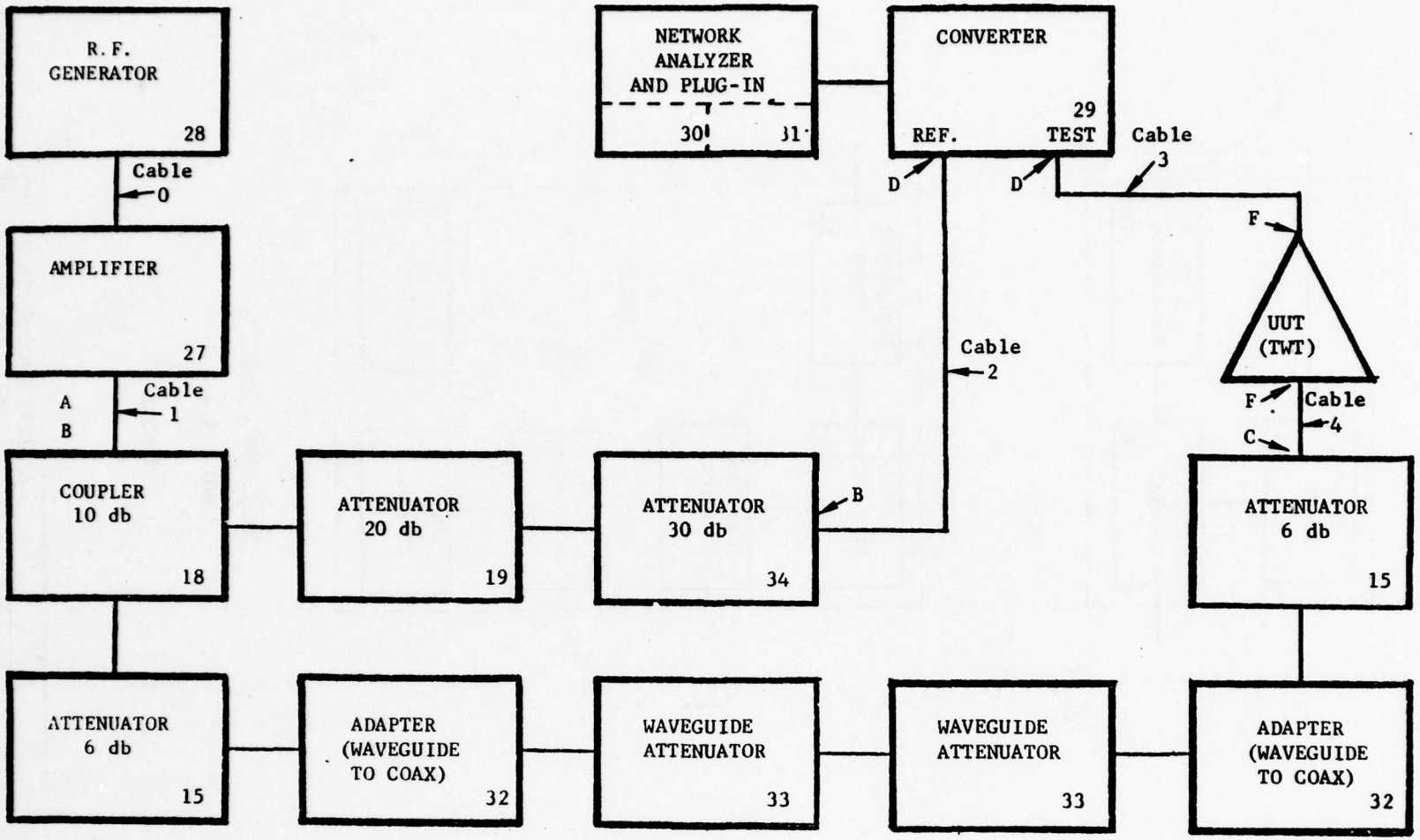
| EQUIPMENT | MAKE (OR EQUIVALENT) | MODEL (OR EQUIVALENT) |
|---|---|---|
| 26. Resistance Bridge | Fluke | 853A |
| 27. Microwave Amplifier | H-P | 493A |
| 28. R.F. Generator | Polarad | 1207 |
| 29. Converter | H-P | 8411 |
| 30. Network Analyzer | H-P | 8410A |
| 31. Network Analyzer Plug-in Unit | H-P | 8413A |
| 32. Adapter Waveguide to Coax | H-P | 281A |
| 33. Waveguide Attenuator | H-P | H382A |
| 34. 30 db Attenuator | Narda | 777C-30 |
| 35. Cable Set | HAC/EDD | 0-1-2-3-4 RG 214/U |




TEST FLOW SEGMENTS

BOXES 1 and 2

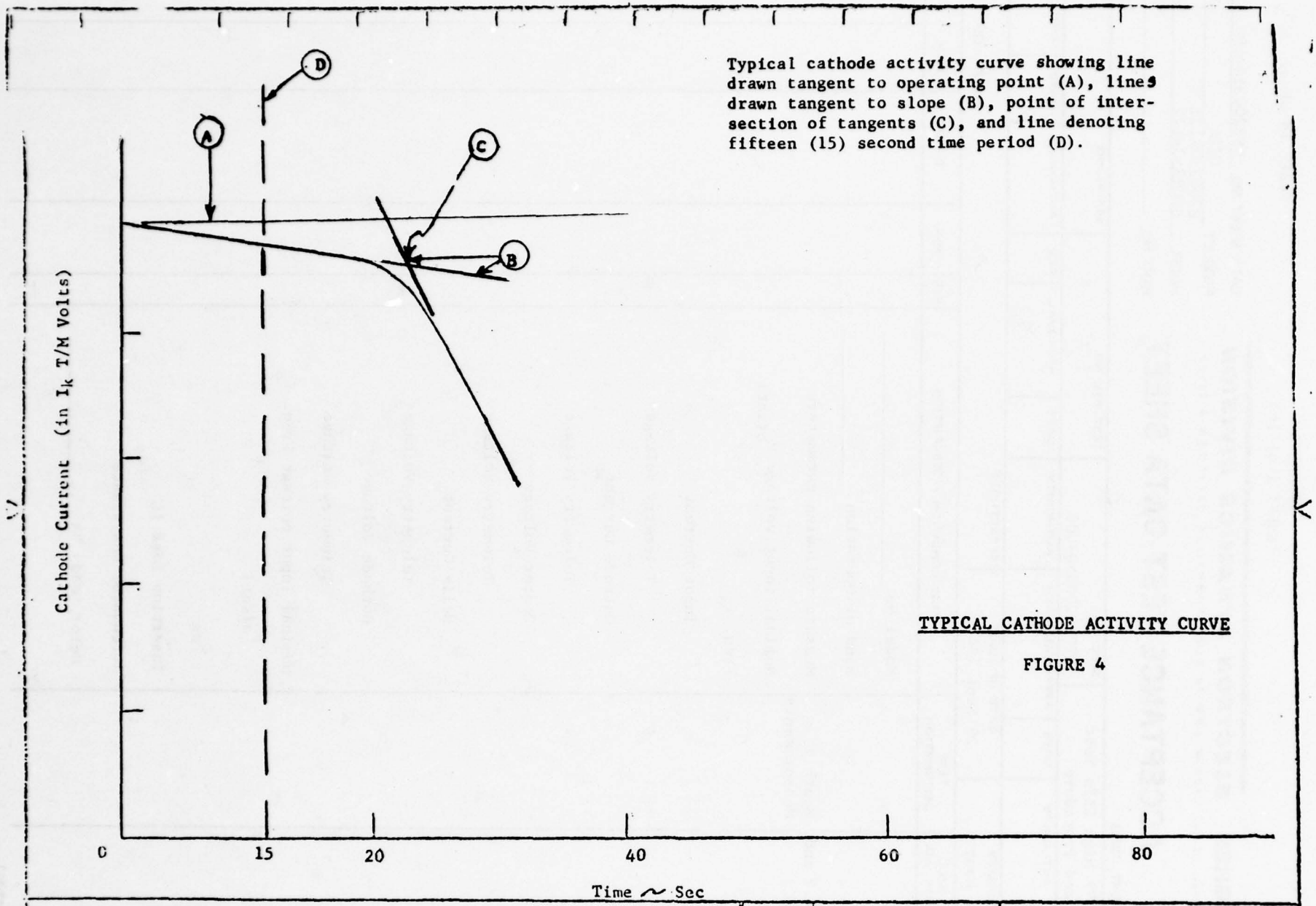
FIGURE 3




NOTES:

1. Cable Set: Equipment List Item 35
2. Labelled end of cable to be connected as shown.

INSERTION LOSS TEST BLOCK DIAGRAM




Typical cathode activity curve showing line drawn tangent to operating point (A), lines drawn tangent to slope (B), point of intersection of tangents (C), and line denoting fifteen (15) second time period (D).

**TYPICAL CATHODE ACTIVITY CURVE**

**FIGURE 4**

HUGHES AIRCRAFT COMPANY

**ELECTRON DYNAMICS DIVISION**

3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400

PRODUCT TWTA

MODEL B200350-121
B200350-122

PART NO. _____

# ACCEPTANCE TEST DATA SHEET

CODE IDENT. 73293

| TEST NAME | SPEC. No. | TEST POS. NO. | SERIAL NO. |
|---|---|---|---|
| High Life Test Plan and Procedure | LTP B200350-400 | | |

| REV. | AUTHORITY | DATE | APPROVAL | REV. | AUTHORITY | DATE | APPROVAL | REV. | AUTHORITY | DATE | APPROVAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | |

| QUALITY | DATE OF ISSUE | EFFECTIVITY |
|---|---|---|
| J. J. Haupt | 29 Sept 1947 | |

PAGE OF

| ITEM | SPEC. PAR. NO. | TEST DESIGNATION | TEST CONDITION / DESCRIPTION | R/C | MIN. | DATA | MAX. | UN |
|---|---|---|---|---|---|---|---|---|
| | 4.2 and 4.3 | Monthly Measurements | Model No. _____ | | | | | |
| | | | Band of Operation _____ | | | | | |
| | | | Measure following parameters: | | | | | |
| | | | Nominal input voltage $P_{o(sat)}$ | | | | | |
| | | | Freq. $f_o$ | | | | | |
| | | | Input Current | | | | | |
| | | | Telemetry Voltage | | | | | |
| | | | Cathode Current | | | | | |
| | | | Telemetry Voltage | | | | | |
| | | | Heater Voltage | | | | | |
| | | | Telemetry Voltage | | | | | |
| | | | Helix Current | | | | | |
| | | | Telemetry Voltage | | | | | |
| | | | Cathode Voltage | | | | | |
| | | | Telemetry Voltage | | | | | |
| | | | Nominal input voltage Freq. $f_o$ | | | | | |
| | | | $P_{o(sat)}$ | | | | | |
| | | | $G_{ss}$ | | | | | |
| | | | Insertion Loss IL | | | | | |
| | | | Attenuator Resistance | | | | | |
| | | | Meter Leads RM _____ | | | | | |

FIGURE 5 (Continued)

(SHEET 2 OF 16)



HUGHES AIRCRAFT COMPANY

**ELECTRON DYNAMICS DIVISION**

3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400

PRODUCT TWTA

MODEL B200350-121 B200350-122

PART NO.

# ACCEPTANCE TEST DATA SHEET

CODE IDENT. 73293

| TEST NAME | SPEC. No. | TEST POS. NO. | SERIAL NO. |
|---|---|---|---|
| lan and Procedure | LTP B200350-400 | | |

| REV. | AUTHORITY | DATE | APPROVAL | REV. | AUTHORITY | DATE | APPROVAL | REV. | AUTHORITY | DATE | APPROVAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | |

| QUALITY | DATE OF ISSUE | EFFECTIVITY |
|---|---|---|
| J. J. Haupt | 29 Sept 1947 | |

PAGE OF

| ITEM | SPEC. PAR. NO. | TEST DESIGNATION | TEST CONDITION / DESCRIPTION | R/C | MIN. | DATA | MAX. | UNITS |
|---|---|---|---|---|---|---|---|---|
| | | | Input Resistance, $R_{Ai}$<br><br>Output Resistance, $R_{AO}$<br><br>Data covering life test duration recorded on attached pages.<br><br>Calculate and record the total accumulated life test hours at the time each measurement is made.<br><br>Plot $P_{o(sat)}$ versus freq. and $G_{ss}$ versus freq. as specified in procedure. | | | | | |

FIGURE 5
(SHEET 3 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-199 SERIAL NO.

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO. LTPB200350-400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$ | | | | TOTAL ACCUMULATED HOURS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | | | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | | | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | | | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | | | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | | | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | | | | | | | | | | | | |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | | | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

FIGURE 5
(SHEET 4 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
2100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO.

## CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

INPUT CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

MONTH OF / / MONTH OF / / MONTH OF / /

FIGURE 5
(SHEET 5 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. A

MODEL NO. B200350-121 B200350-122 SERIAL NO.

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO.: LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)

4

3

2

MONTH OF / / /

FIGURE 5
(SHEET 6 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. _____

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_O$(sat); Freq $f_O$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

MONTH OF / / MONTH OF / / MONTH OF / /

FIGURE 5
(SHEET 7 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. A

MODEL NO. B200350-121 B200350-122 SERIAL NO.

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_O$(sat); Freq $f_O$

HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

MONTH OF / MONTH OF / MONTH OF /

FIGURE 5
(SHEET 8 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. A
B200350-121
MODEL NO. B200350-122 SERIAL NO.

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 | |
|---|---|---|---|---|

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5
4
3

MONTH OF / / MONTH OF / / MONTH OF / /

TEST CONDUCTOR

RELIABILITY PROJECT ENGINEER

FIGURE 5
MONTHLY MEASUREMENTS
(SHEET 9 OF 16)

PART NO.

S/N

DATE

ELAPSE TIME

Para. 4.3.3 Saturated Power Output Versus Frequency Curve

Saturated Power Output

Frequency

FIGURE 5
(SHEET 10 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. _____

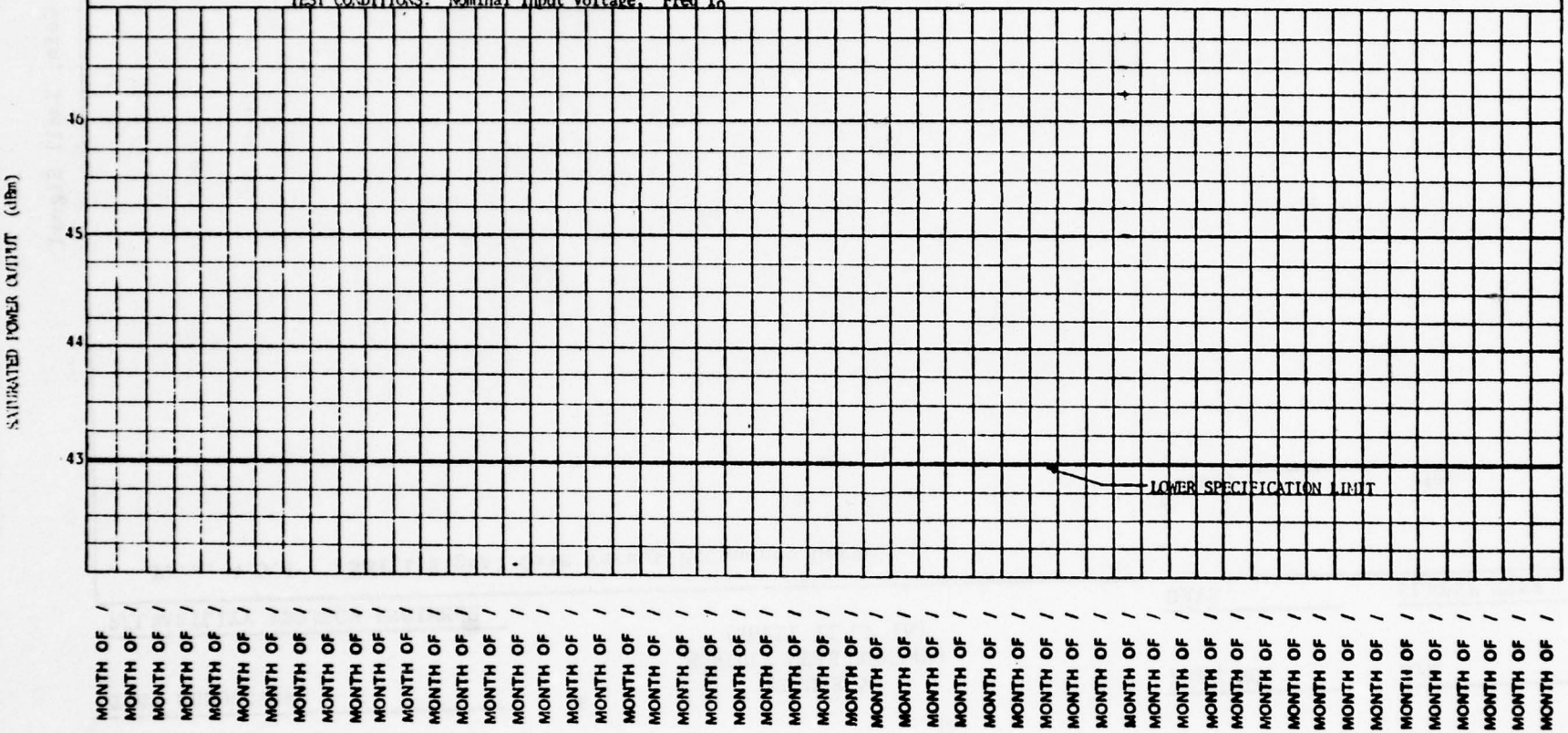
## CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_0$



TEST CONDUCTOR

RELIABILITY PROJECT ENGINEER

FIGURE 5
MONTHLY MEASUREMENTS
(SHEET 11 OF 16)

PART NO. _____ S/N _____

DATE _____ ELAPSE TIME _____

Para. 4.3.1 Small Signal Gain Versus Frequency Curve

$P_{i(rf)}$ _____dbm

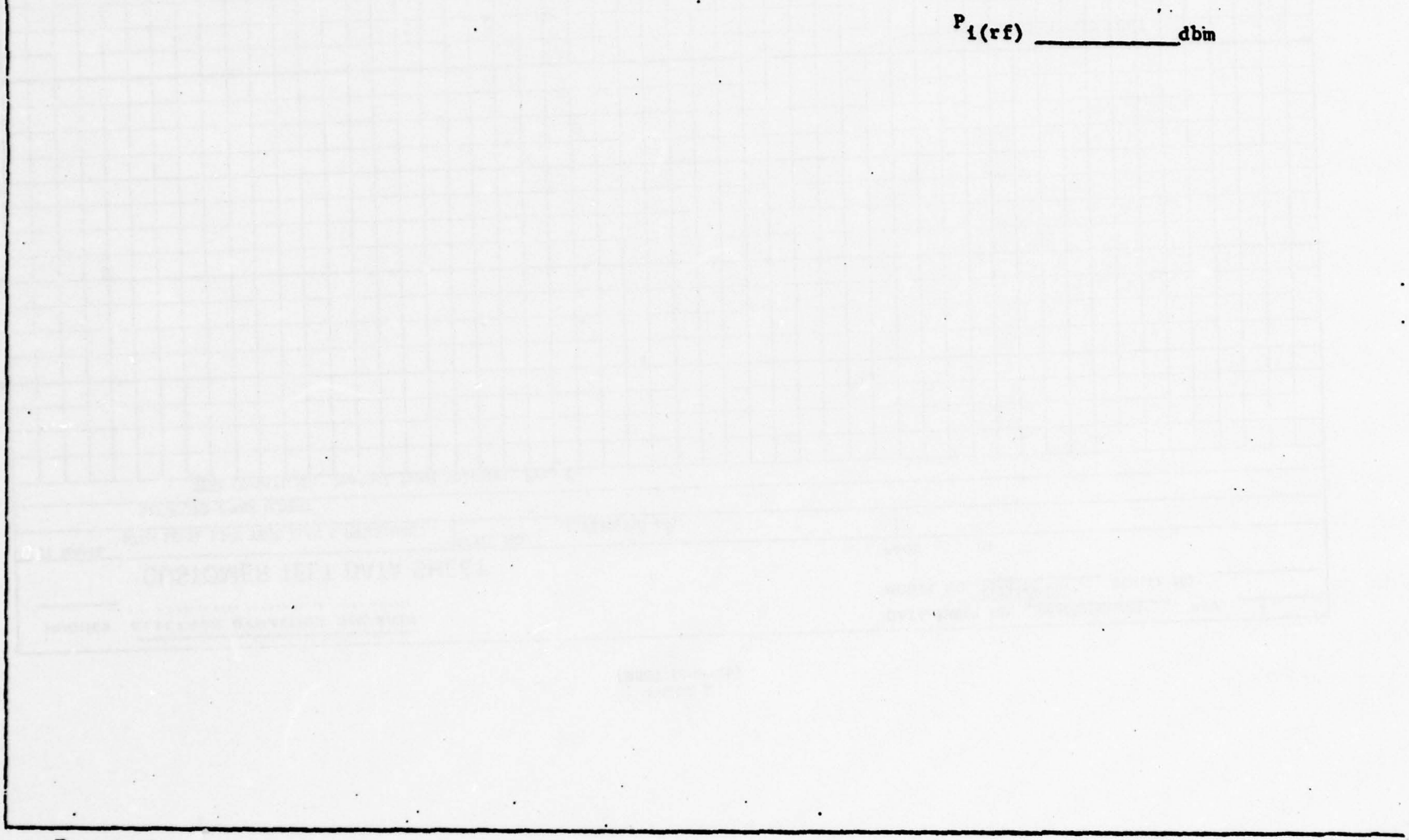


FIGURE 5
(SHEET 12 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. _____
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$

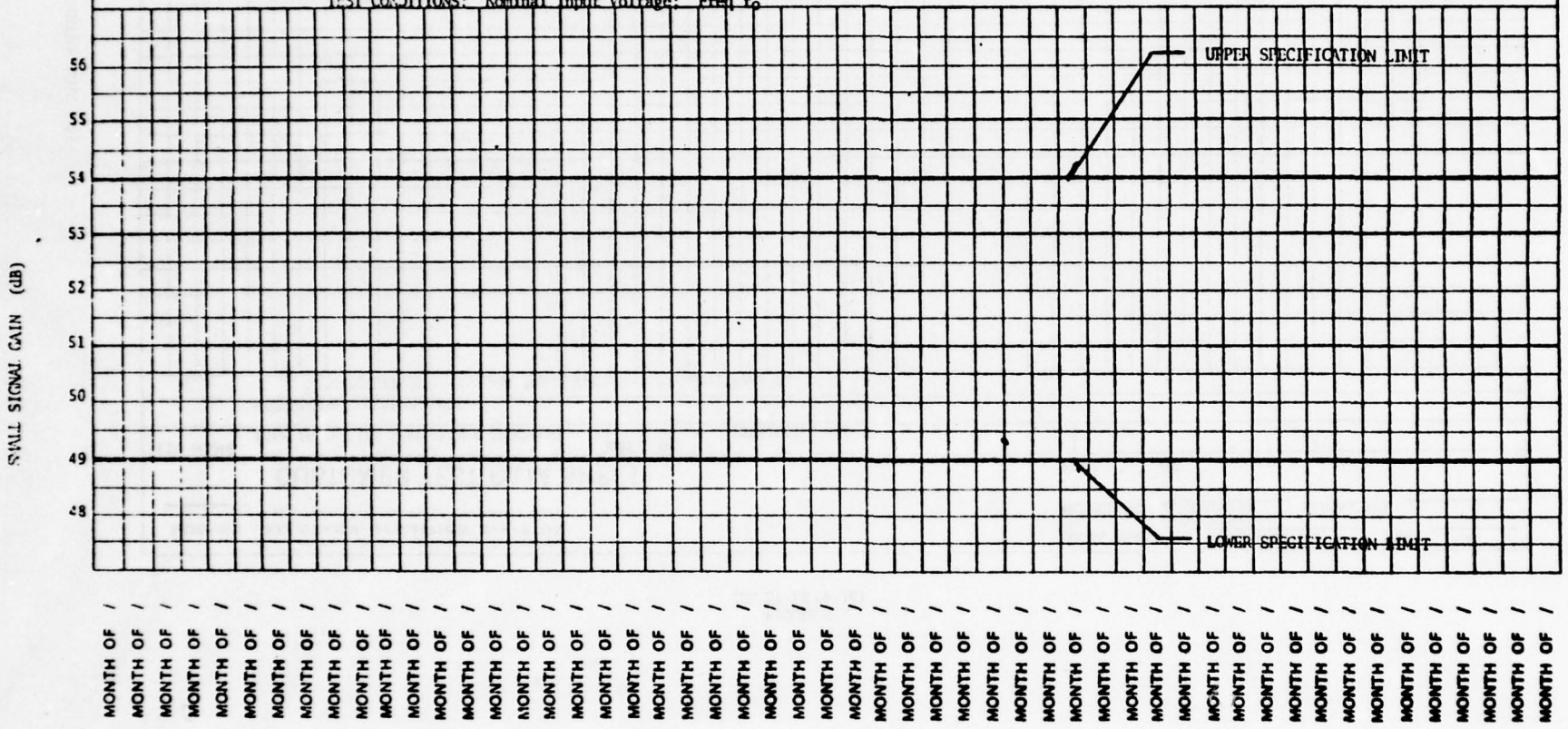


FIGURE 5
(SHEET 13 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO.

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

INSERTION LOSS (dB)

MONTH OF / / MONTH OF / / MONTH OF / /

FIGURE 5
(SHEET 14 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
B200350-121
MODEL NO. B200350-122 SERIAL NO. _____

## CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

MONTH OF / / MONTH OF / / MONTH OF / /

FIGURE 5
(SHEET 15 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. _____

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - OUTPUT (OHMS)

MONTH OF / / MONTH OF / / MONTH OF / /

FIGURE 5
(SHEET 16 OF 16)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO.

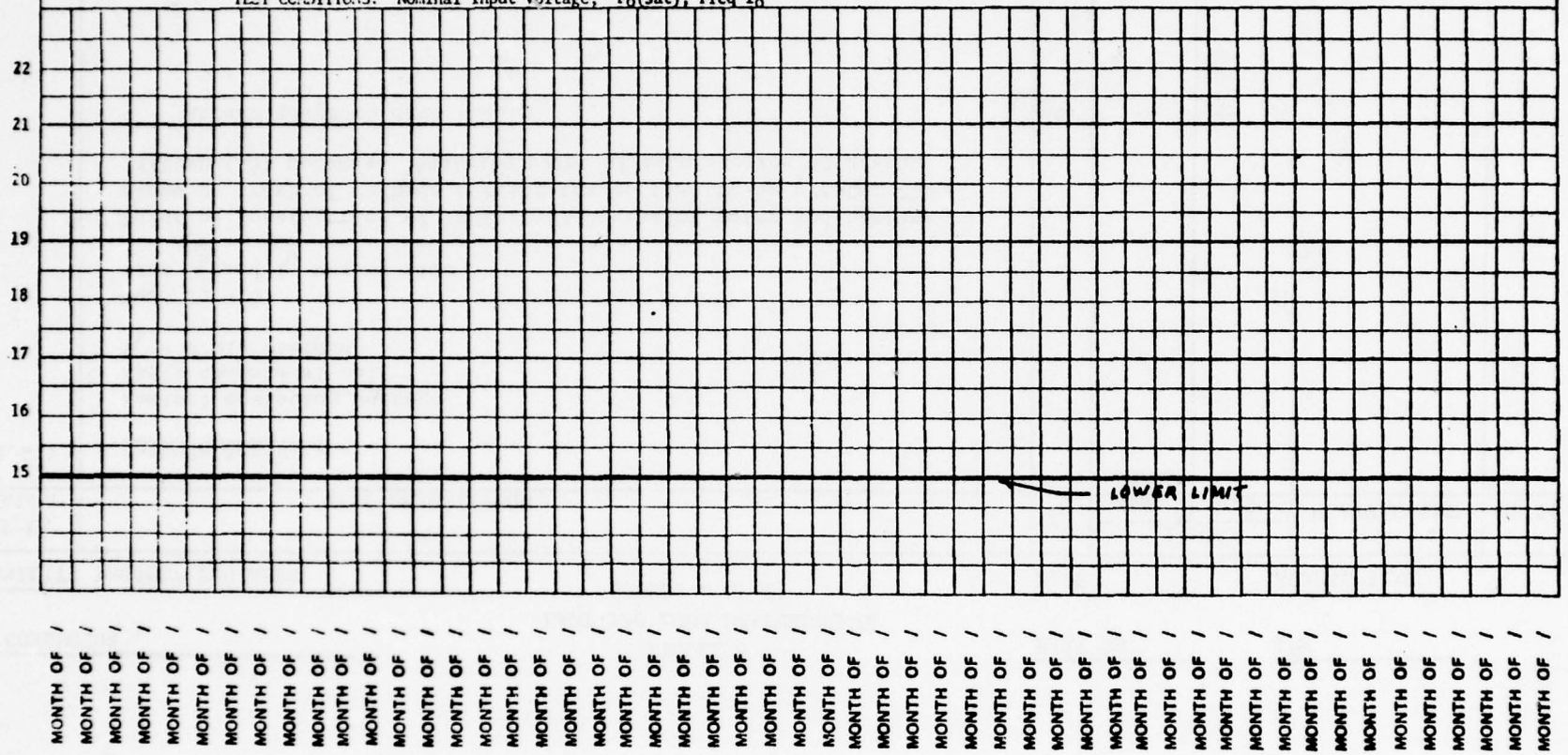
## CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



ST CONDUCTOR

LIABILITY PROJECT ENGINEER

**FIGURE 6**
**LAST 500 HOUR MEASUREMENTS**
**(SHEET 1 OF 2)**

PART NO.

S/N

DATE

ELAPSE TIME

| SPEC PAR. NO. | TEST DESCRIPTION | R/C | LIMITS MIN | LIMITS MAX | MEASUREMENT | UNITS |
|---|---|---|---|---|---|---|
| 4.4.1 | Cathode Activity<br><br>Nominal operating voltage<br>Apply command signal<br>$t_k$ = 3 min minimum<br><br>Turn $E_f$ = 0<br>Plot $I_k^f$ and $I_w$ versus time<br><br>Point of intersection of tangent to operating point and tangent to slope on graph of cathode current versus time to be greater than fifteen (15) seconds. Indicate point of intersection on graph.<br><br>Attach graph to data sheets | C | -- | -- | | -- |

TEST CONDUCTOR

RELIABILITY PROJECT ENGINEER

FIGURE 6
LAST 500 HOUR MEASUREMENTS
(SHEET 2 OF 2)

PART NO.

S/N

DATE

ELAPSE TIME

Para. 4.4.1 Cathode Activity Test

Cathode Current (mA)

Time (sec)

FIGURE 7

777 LIFE TEST DISCREPANCY REPORT

PART NO. _____ DATE _____ ELAPSE TIME _____

SERIAL NO. _____ _____

TEST CONDUCTOR

| ITEM | DESCRIPTION OF NONCONFORMANCE |
|---|---|
| | |

DISPOSITION AND REWORK INSTRUCTIONS

RELIABILITY PROJECT ENGINEER DATE | CUSTOMER REPRESENTATIVE DATE

FIGURE 8

| PART NO. | SERIAL NO. |
|---|---|

| TE | PARAGRAPH NO. | VARIATION | INITIALS |
|---|---|---|---|
| | | | |

APPENDIX C

777 MODEL 1202H HIGH LEVEL TWTA

ACCEPTANCE TEST PROCEDURE

ATP B200350-400

| REVISIONS | | | | APPROVED | | | |
|---|---|---|---|---|---|---|---|
| DATE | LTR | EFFECT | DESCRIPTION | QC | RED | MFG | REL |
| 3/4/70 | C | 11-1<br>21-1 | Incorporated ECN A5635 and Issued Data Sheets | | | | |
| 3/24/70 | D | 21-1 | Incorporated ECN A5751<br>Data Sheets not affected | | | | |
| 3/26/70 | E | 12-1 & Up<br>22-1 & Up<br>14-1 & Up<br>24-1 & Up | Incorporated ECN A5752 | | | | |
| 3/31/70 | F | 12-1 & Up<br>22-1 & Up<br>14-1 & Up<br>24-1 & Up | Incorporated ECN A5783 | | | | |
| 7/29/70 | G | 12-1 & Up<br>22-1 & Up<br>14-1 & Up<br>24-1 & Up | Incorporated ECN's B13256 and B13304<br>Revised data sheets to Rev A | | | | |
| 9/2/70 | H | 9/2/70 | Incorporated ECN B13338 and B13379<br>Revised data sheets to Rev. B. | | | | |
| 12/7/70 | J | 12-1 & Up<br>22-1 & Up<br>14-1 & Up<br>24-1 & Up | Incorporated ECNs B13496 and B13498.<br>Data Sheets revised to Rev. C | | | | |
| 1/25/71 | K | 1/25/71<br>All except Eng. Models | Incorporated ECN B13596<br>Data Sheets revised to Rev. D.<br>Incorporated ECN B13599 | | | | |
| 3/18/71 | L | 3/18/71 | Incorporated ECN A7618 Data Sheets revised to Rev. E, Addendum 1 Data Sheets Revised to Rev. A. | | | | |

RELEASED PRINT ENG DOC CONTROL CTR | L REV | 3-18-1 REL DATE | REL BY

| Sheet | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rev. | L | C | C | G | J | G | K | J | H | C | G | C | C | C | C | C | C | F | F | F | C | F | G | D | D | J |
| Sheet | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| Rev. | K | L | C | C | C | C | C | F | F | F | F | C | C | C | C | C | C | C | C | F | C | C | C | C | C | K |

NEXT ASSY. B200350-10X, B200350-11X, B200350-12X

END USE N/A 1202.4

PREP BY

QC

R D

MFG

REL

DATE OF ISSUE 18 March 1971

HUGHES ELECTRON DYNAMICS DIVISION

ACCEPTANCE TEST PROCEDURE

PLATFORM NAV SUB ASSEMBLY, BOX LEVEL

SIZE A | CODE IDENT NO. 73293 | A 1200350-400

REV L | SHEET 1 OF 52

FORM 1041A 75-75 67 REV

## 1.0 INTRODUCTION

### 1.1 Scope

The purpose of this document is to delineate the individual acceptance tests to be performed on each traveling wave tube amplifier (TWTA) to demonstrate compliance with TRW specification EC-EQ4-664.

Acceptance tests shall be conducted at Hughes Aircraft Company or other test facilities as specifically approved by TRW. Prior to the start of acceptance test the cognizant representative of EDD quality assurance department, the cognizant TRW representative and the cognizant Government representative shall be notified and may be present.

### 1.2 Test Requirements

Engineering models shall be tested in accordance with Part I of this document. Flight and life models shall be tested in accordance with Part II of this document.

## 2.0 SPECIFICATIONS

### 2.1 Applicable Specifications

The following specifications form a part of this document to the extent specified herein.

| | |
|---|---|
| **TRW Systems Group** | |
| EC-EQ4-664B | Detail Specification for High Level Traveling Wave Tube Amplifier |
| EV2-23B | Environmental Specification for Electrical and Mechanical Equipment for Project 777 |
| **Drawings, HAC-EDD** | |
| B200350-500 | Installation and Control Drawing High Level Traveling Wave Tube Amplifier |
| B200350-10X<br>B200350-11X<br>B200350-12X | High Level Traveling Wave Tube Amplifier Assembly |
| **HAC-EDD Documents** | |
| CMP-777 | Configuration Management Plan |

## 3.0 GENERAL

### 3.1 Failures

Any failure experienced during acceptance test (except a test equipment failure) shall require a malfunction report, Form EDD 1146. Performance degradation during, or as a result of, tests or environmental exposures will not necessarily constitute a failure. However, any performance degradation beyond the limits specified herein will constitute a failure.

### 3.2 Customer Test Data Sheets

The results of acceptance tests shall be recorded on customer test data sheets which are controlled by this procedure and revisions hereto.

All entries made during acceptance testing must be in ink. Deletions and/or corrections to the data sheets shall be made by ruling out the appropriate portions of the test data and inserting the corrections. Ruled-out data must remain legible and be signed and dated by the person making the correction.

Completed data sheets shall be signed or stamped by the cognizant EDD Quality Assurance representative.

#### 3.2.1 Preparation of Data

One copy of the following data will be submitted with each delivered TWTA and shall become part of the TWTA Log Book.

A. TWTA Acceptance Test Data (Customer Test Data Sheets)

B. TWT Acceptance Test Data (Customer Test Data Sheets)

C. Power Supply Acceptance Test Data (Customer Test Data Sheets) including telemetry calibration curves

D. Operating Time Log

E. Malfunction Reports

F. "As Delivered Parts List" per CMP-777

### 3.3 Calibration

The Hughes EDD system of calibration for test and measurement equipment complies with the requirements of MIL-C-45662A.

3.4 Part Numbering and Frequency Designation

TWTA part numbers are as follows:

| Engr. Models | Life and Qual. Models | Flight Models |
|---|---|---|
| B200350-101 | -121 | -121 |
| B200350-102 | -122 | -122 |

The operating frequency range shall be designated by the last numeral (1 for "K" band and 2 for "L" band) of the part dash number. Frequencies of test relative to band limits are designated as follows:

| | |
|---|---|
| $f_3$ | Low End Useful Band |
| $f_1$ | Low End Operating Band |
| $f_o$ | Center Operating Band |
| $f_2$ | High End Operating Band |
| $f_4$ | High End Useful Band |

3.5 Standard Test Conditions

Ambient test conditions for conducting TWTA performance tests prior to or after environmental exposures shall be as indicated below unless otherwise specified.

A. Temperature, $50^{o}F$ to $95^{o}F$
B. Relative Humidity, 90% RH or less
C. Barometric Pressure, Prevailing Laboratory Pressure

3.6 Environmental Test Tolerances

| | |
|---|---|
| A. Vibration Amplitude (grms) | ± 10% |
| B. Vibration Frequency | ± 2% |
| C. Random Vibration RMS g level | ± 10% |
| Power Spectral Density (using filters with a 50 cps bandwidth or less) | ± 3 db |
| D. Pressure-Altitude | ± 5% ≦ 200,000 ft. |
| -Vacuum | Equal to or less than the specified value |
| E. Temperature | ± $5^{o}F$ |
| F. Test Time Duration | ± 10% |

3.6.1 Vacuum Measurements

Vacuum measurements shall be made using an instrument which is conductively connected to the same vacuum environment as the test unit.

3.7 Test Sequence

The order of test paragraphs as listed does not represent the required sequence of tests. Functional and environmental tests may be performed in any sequence. To facilitate testing, steps from one Functional Test paragraph may be performed in conjunction with steps from any other Functional Test paragraph at the option of Hughes EDD.

3.8 Vibration Fixture

The test fixture shall be designed to support the TWTA at its normal mounting points. Transmissibility between test item mounting points shall not exceed a factor of ± 3 db between 5 and 500 Hz; between 500 and 2000 Hz a factor of ± 6 db is allowed provided the total cumulative bandwidth which exceeds ± 3 dB does not exceed 300 Hz. Cross-talk shall not exceed the input by greater than 3 db. A fixture evaluation will be performed in accordance with Paragraph 3.8.1.

3.8.1 Fixture Evaluation

The transmissibility and cross-talk of the test fixture shall be determined by sweeping a sinusoidal signal through the frequency range of 5 to 2000 Hz at a rate of 2 octaves/minute. The test amplitude shall be one g peak in each of the three (3) mutually perpendicular areas. The low-frequency input shall be limited to 0.5 inches double amplitude. This evaluation shall be performed once and results shall be on file at Hughes EDD.

3.9 Rejection and Retest

If a failure, malfunction, or out-of-tolerance performance degradation occurs during or after a test, as appropriate, the tests shall be discontinued, the deficiency (including any defect) corrected, and the pertinent test procedure repeated until completed successfully. If the corrective action substantially affects the significance of results of previously completed tests, such tests shall also be repeated.

3.10 Plug Savers

Plug savers shall be used on the RF connectors and power connector at all times during handling of the TWTA, except where critical test measurements are affected. (Does not apply to cathode activity connectors.)

3.11 Burn-In

Prior to the start of acceptance test each TWTA shall have accumulated 336 hours burn-in. Burn-in shall be performed at a

3.11 Burn-In (Cont'd)

constant elevated temperature of 125 ± 15°F with nominal voltages applied.

Engineering, life test, Qualification and first three flight models (one -121 and two -122) shall have accumulated burn-in time in accordance with the following schedule:

Engineering Models

| | | |
|---|---|---|
| Traveling Wave Tube (TWT) | - | 500 hours |
| Power Supply | - | 168 hours |

Life Test

| | | |
|---|---|---|
| Traveling Wave Tube (TWT) | - | 500 hours |
| Power Supply | - | 168 hours |
| Traveling Wave Tube Amplifier (TWTA) | - | No Requirement |

First Three Flight Models

| | | |
|---|---|---|
| Traveling Wave Tube (TWT) | - | 500 hours |
| Power Supply | - | 168 hours |
| *Traveling Wave Tube Amplifier (TWTA) | - | 100 hours |

*Note: All operating time during Qualification and/or Acceptance testing shall apply toward the TWTA Burn-In time requirements.

3.12 Preparation for Delivery

Units shall be packaged, packed and mailed for shipment as specified herein.

3.12.1 Connectors

Plug savers shall be employed to protect all connectors until the unit is delivered to TRW and is delivered "In Place" with the equipment.

3.12.2 Mounting Pads

The machined surfaces and mounting holes shall be protected.

3.12.3 Unit Packaging

The unit shall be bagged and sealed in a polyethylene bag. The thickness of the polyethylene bag shall be at least 0.003 inches.

3.12.4 Cushion Material

The unit shall be cushioned by using polystyrene foam or equivalent material.

3.12.5 Marking

The shipping container shall be durably and legibly marked to provide the following information:

A. Item Name
B. Manufacturer
C. Manufacturer's Serial Number
D. TRW Purchase Order Number
E. Date of Manufacture
F. "Project 777 Spacecraft Material - Handle With Care"
G. Part Number

3.12.6 Documentation

One copy of test data in accordance with Paragraph 3.2.1 shall be shipped with each unit.

ACCEPTANCE TEST - PART I (ENGINEERING MODEL)

4.0 FUNCTIONAL TEST

The cathode activity test of Para. 4.1 shall be performed during the final functional tests of Para. 11.0. Nominal DC input voltage as referenced herein is defined as 28 ± .5 Vdc.

The command signal is defined as 5 ± 0.25 Vdc. The absence of a command signal is defined as 0 ± .25 Vdc.

4.1 Cathode Activity

Step 1: Connect the TWTA as outlined in Figure 1. Apply nominal voltage and and the command signal. Allow at least three minutes for stabilization.

Step 2: Remove heater voltage. Plot cathode and helix current versus time using the telemetry outputs.

Step 3: Using the graph of cathode current versus time, draw two lines, one tangent to the slope of the portion prior to the knee and one tangent to the slope of the portion after the knee. The point of intersection of these two lines shall be greater than fifteen (15) seconds. See Figure 19). Check. Attach curve to data sheets.

4.2 Stability (Overdrive)

This test shall be performed prior to other functional tests. Test equipment per Figures 1 and 2.

Step 1: Connect the TWTA as outlined in Figures 1 and 2. Apply nominal operating voltages, apply on command signal.

Step 2: Set signal generator to $f_o$. Adjust the RF input drive level to 12 db above the drive level required for saturation. This condition shall be maintained for 10 minutes. The RF output power shall be monitored during this period. The TWTA shall exhibit no erratic behavior. Check.

Step 3: Repeat Step 2 with the input voltage adjusted to 23 and 33 ± 0.5 Vdc.

4.3 Command Signal

Step 1: Connect the TWTA as outlined in Figures 1 and 2. Adjust input voltage to 23 ± .5 Vdc. Apply nominal RF drive.

Step 2: Apply command signal. The unit shall turn on and RF power shall be present. Check.

Step 3: Remove command signal; unit shall turn off. Readjust input voltage to 33 ± .5 Vdc and apply command signal. The unit shall turn on and RF power output shall be present. Check.

Step 4: Remove command signal; unit shall turn off.

4.4 Inrush Current Characteristics

Step 1: Connect the TWTA as outlined in Figures 1 and 2. Install a 0.1 to 0.2 ohm resistor in the TWTA positive (+) input and adjust the input voltage to 33 ± .5 Vdc.

Step 2: Apply the command signal. Monitor the inrush current with an oscilloscope and photograph inrush current wave form.

Step 3: The inrush current characteristics shall conform to the following criteria; calculate from the photograph of Step 2:

(a) During any five milliseconds the integral with time of current in excess of $I_{ss}$ shall not exceed 30 milliampere seconds. In addition, the inrush current integral at the on command shall not exceed 3.7 milliampere seconds in excess of $I_{ss}$ over a 3 milliseconds interval.

(b) The current shall not exceed $I_{ss}$ by more than 15 amperes except at the application of high voltage, at which time the current shall not exceed $I_{ss}$ by more than 25 amperes.

Step 4: If necessary to obtain the data of Step 3, remove command signal and repeat Step 2.

Step 5: Remove command signal and reset the camera equipment.

Step 6: Apply command signal. At the instant of the high voltage turn-on, 90 ± 30 seconds after the command signal, (record the turn-on elapsed time), monitor the inrush current with the oscilloscope and photograph the inrush current wave form.

4.4 Inrush Current Characteristics (Cont'd)

(a) At no time period after 5 milliseconds past the application of high voltage shall the current exceed $I_{ss}$ + 0.75 ampere.

(b) Input current shall decay to within ±3% of $I_{ss}$ within 100 milliseconds after the application of the high voltages. Check.

Step 7: Repeat Step 6 as required.

4.5 Input and Output Reflection Coefficient

Connect the TWTA as outlined in Figures 1 and 2 except connect the dual directional coupler to a short instead of the TWTA RF input.

Step 1: Set the sweep oscillator to the $f_o$ frequency position (verify with a frequency meter).

Step 2: Place the match graph on X-Y plotter and set the ratio meter range switch to 100%.

Step 3: Adjust the reference control to obtain a reading of 100 on the percent reflection scale. Adjust the X-Y plotter gain to the 100% line on the match graph and mark the $f_o$ point.

Step 4: Disconnect the reflected input to the ratiometer and adjust the zero percent line on the graph.

Step 5: Reconnect the reflected input to the ratiometer and readjust the reference of Step 3, if necessary.

Step 6: Sweep the frequency from $f_3$ to $f_4$ and plot the curve.

Step 7: Verify that the $f_o$ point falls on the 100% line of the match graph as outlined in Steps 1 through 3. Repeat Steps 1 through 5, if necessary.

Step 8: Remove the short and connect the TWTA RF output to the dual directional coupler. Apply nominal input voltage and the command signal. Plot the curve of the RF output reflection over the frequency range of $f_3$ to $f_4$ and indicate $f_1$ and $f_2$ points.

4.5 Input and Output Reflection Coefficient (Cont'd)

Step 9: From the data obtained in Step 8, record the maximum TWTA output reflection in the range of $f_1$ to $f_2$. Output reflection shall be a maximum of 33.3%. (2.0:1) Convert reflection coefficient to VSWR and record.

Step 10: Remove command signal and repeat Step 8 with range switch set to 30%. Use a new match graph data sheet. This gives a plot of the cold output reflection coefficient of the TWTA. Record the maximum cold output reflection in the range of $f_1$ to $f_2$. Cold output reflection shall be a maximum of 20%. (1.5:1) Convert reflection coefficient to VSWR and record.

Step 11: Repeat Steps 1 through 7 on a new match graph data sheet.

Step 12: With no command signal, repeat Steps 8 and 9 in the input end of the TWTA, connecting the dual directional coupler to the TWTA RF input. Cold input reflection coefficient shall be a maximum of 11%. (1.25:1) Convert reflection coefficient to VSWR and record.

Step 13: Apply command signal and repeat Step 12. Hot input reflection shall be a maximum of 11%. (1.25:1) Convert reflection coefficient to VSWR and record.

Step 14: Attach graphs to data sheet.

4.6 Saturated Power Output and Saturated Gain

Step 1: Connect the TWTA as outlined in Figures 1 and 2. Apply nominal voltage and the command signal to the TWTA. Set the sweep oscillator frequency at $f_0$ and adjust the RF input power to the level required to produce saturated power output.

Step 2: Record the RF input level and the telemetry output voltages.

Step 3: Vary the frequency over the band $f_1$ to $f_2$ and adjust the gain of the X-Y recorder to obtain a scale which will contain the saturated power output versus frequency curve.

Step 4: Plot calibrated lines on the graph at 0.2 dB intervals, beginning at 43 dbm.

Step 5: Plot saturated power output versus frequency over the band of $f_1$ to $f_2$. Power output shall be a minimum of 43 dBm. Check.

AD-A053 739 HUGHES AIRCRAFT CO TORRANCE CALIF ELECTRON DYNAMICS DIV F/G 9/1
DEFENSE SATELLITE COMMUNICATIONS SYSTEM TRAVELING WAVE TUBE AMP--ETC(U)
FEB 78 M L KAHN F04701-74-C-0542
UNCLASSIFIED NL

2 OF 5
AD A053739



4.6 Saturated Power Output and Saturated Gain (Cont'd)

Step 6: Calculate the saturated gain at $f_0$. Gain at saturation shall be in the range of 45 to 48 dB. Record. Attach graph to data sheets.

4.7 Saturated Power Output, Saturated Gain and Input Power Versus Input Voltage

Step 1: Repeat Paragraph 4.6 (except Step 2) with the input voltage adjusted to 23 ± .5 Vdc. Record DC input current.

Step 2: Calculate the DC input power and record. The DC input power shall not exceed 103 watts.

Step 3: Repeat Step 1, except adjust the input voltage to 33 ± .5 Vdc.

Step 4: Calculate the DC input power and record. The DC input power shall not exceed 103 watts.

Step 5: Attach graphs to data sheets.

4.8 Saturated Power Output Variation

Step 1: From the graphs of Paragraphs 4.6, 4.7 Steps 1 and 3, calculate the saturated power output variation over the band of $f_1$ to $f_2$. Total variation of each graph shall be a maximum of ± 0.25 dB. Check.

4.9 Gain Flatness (Useful Band)

Step 1: Repeat Steps 1 and 3 of Paragraph 4.6 except over the band of $f_3$ to $f_4$.

Step 2: Plot calibration lines on the graph at 0.2 dB intervals beginning at 42 dBm indicating the $f_1$, $f_2$, $f_3$ and $f_4$ points.

Step 3: Plot saturated power output -1 dB over the frequency range.

Step 4: Repeat Steps 1 and 3 of Paragraph 4.7.

Step 5: Repeat Steps 1 and 2 above.

Step 6: From the graphs calculate the gain variation over the useful band $f_1$ to $f_3$ and $f_2$ to $f_4$. The gain flatness of each graph shall be as shown in Figure A. Check.

Step 7: Attach graphs to data sheets.

4.10 Small Signal Gain and Gain Flatness

Step 1: Connect the TWT as outlined in Figures 1 and 2. Apply nominal input voltage and the command signal. Set the

4.10 Small Signal Gain and Gain Flatness (Cont'd)

sweep oscillator frequency at $f_0$ and insert a 20 dB attenuator in the RF input leg. Adjust the RF input power to a level 20 dB below saturation. Measure and record the small signal gain. Small signal gain shall be in the range of 49 to 54 dB. Record.

Step 2: Vary the frequency over the band $f_3$ to $f_4$ and adjust the gain of the X-Y recorder to obtain a scale which will contain the small signal gain versus frequency curve.

Step 3: Plot calibration lines on the graph at .2 dB intervals indicating the $f_1$, $f_2$, $f_3$ and $f_4$ points.

Step 4: Plot small signal gain versus frequency over the band.

Step 5: Repeat Steps 1 through 4 at 23 ± .5 Vdc.

Step 6: Repeat Steps 1 through 4 at 33 ± .5 Vdc.

Step 7: From the graphs calculate gain variation over the band of $f_1$ to $f_2$. Small signal gain variation of each graph shall be a maximum of ± 0.35 dB (see Figure A). Attach graphs to data sheets. Record worst case gain variation.

4.11 Small Signal Gain Slope

Step 1: From the graphs of Paragraph 4.10, calculate gain slope over the band of $f_1$ to $f_2$. Gain slope of each graph shall not exceed 0.02 dB/MHz. Record worst case gain slope.

Step 2: From the graphs of Paragraph 4.10, calculate gain slope over the band of $f_1$ to $f_3$ and $f_2$ to $f_4$. Gain slope of each graph shall not exceed 0.035 dB/MHz. Record worst case gain slope.

4.12 Noise Figure

Step 1: Connect the TWTA as outlined in Figures 1 and 4. Apply nominal input voltage and the command signal to the TWTA.

Step 2: Set sweep oscillator to $f_0$. Adjust generator current to 175 ma.

Step 3: Calibrate noise figure indicator for noise source used.

Step 4: Depress button marked "Auto" and read noise figure. Noise figure shall not exceed 35 dB. Record.

4.13 Intermodulation Distortion

Step 1: Connect TWTA per Figures 1 & 5. Apply nominal operating voltages. Adjust signal generator #1 to $f_o$ in the desired band.

Step 2: Adjust waveguide attenuation #1 to 3 db. Using the spectrum analyzer, saturate TWTA with coax. attenuator #1. Do not disturb coax. attenuator #1.

Step 3: Adjust waveguide attenuator #1 to 23 db. Insert signal generator #2 and adjust coax. attenuator #2 such that both signal levels are equal on the spectrum analyzer.

Step 4: Adjust Frequency separation for 2 MHz. Check for equal signal levels. Adjust coax attenuator #2 if necessary.

Step 5: Re-adjust input waveguide attenuator #1 to obtain 2 carrier saturation as displayed on spectrum analyzer.

Step 6: Re-adjust coax attenuator #2 for equal levels. Adjust waveguide attenuator #2 to 5 db.

Step 7: Adjust frequency of signal generator #3, 1 MHz above $f_o$.

Step 8: Adjust output level of signal generator #3 (injected signal) until its level is equal to that of the 2 carriers. Do not adjust this level again during test.

Step 9: Adjust input waveguide attenuator #1 to 1 db. Adjust waveguide attenuator #2 until injected signal is equal to height of the 2 carrier Power Output. Record reading of waveguide attenuator #2.

Step 10: Repeat Step 9 by varying the input waveguide attenuator #1 in 2 db steps from 3 to 31 db. Record attenuator setting of waveguide attenuator #2 for each point.

Step 11: Adjust set input waveguide attenuator #1 to 1 db. Increase IF gain of spectrum analyzer until 3 IM products are at a convenient readable level. Adjust waveguide attenuator #2 until injected signal is equal to height of the third order IM products. Record reading of waveguide attenuator #2.

4.13 Intermodulation Distortion (Cont'd)

Step 12: Repeat Step 11 by varying the input waveguide attenuator #1 in 2 db steps from 3 to 25 db. Record attenuator setting of waveguide attenuator #2 for each point.

Step 13: From the data collected plot the points and draw curves of the two carrier and 3 IM versus input attenuator settings. The graph's X axis will be the waveguide attenuator #1 settings and the Y axis will be the waveguide attenuator #2 readings.

Step 14: Using the completed curves, find the true 2 carrier saturation power output point on the X axis, subtract 2 db from this point and note this db reading on the Y axis for the 2 carrier power out and the 3 IM curves. The difference of these readings will be the IM at a drive level 2 db over saturation and shall be a minimum of 9 db. Record.

Step 15: From the saturation power output point on the Y axis subtract 3 db. Note X axis point for reference and find Y axis reading on 3 IM curve for the X axis reference point. The difference of the Y axis readings will be the IM at an output power 3 db below saturation and shall be a minimum of 18 db. Record.

Step 16: Repeat Step 15 for output power 6 db below saturation. The IM shall be a minimum of 27 db. Record.

4.14 Phase Shift

Step 1: Connect the TWTA as outlined in Figures 1 and 6. Apply nominal voltages and the command signal. Set the sweep oscillator frequency at $f_o$ and, using attenuator No. 1, adjust the reference channel meter on the network analyzer to indicate a proper level.

4.14 Phase Shift (Cont'd)

Step 2: Using attenuator No. 2, adjust the RF input power to 2 dB above the level required for saturated power output.

Step 3: Adjust the recorder X axis for a convenient sweep width and the Y axis sensitivity to produce a curve which will fit the paper.

Step 4: Plot a graph from 2 dB above saturated output power to 28 dB below by increasing attenuator No. 2. One graph shall cover the range of + 2 dB above saturation to -10 dB below, the other graph from -10 dB to -28 dB below saturation. The maximum incremental phase shift shall not exceed 45°/30 dB. Record. Attach graphs to data sheets.

4.15 AM/PM Conversion

Step 1: Connect TWTA as outlined in Figures 1 and 7. Apply nominal voltage and the command signal.

Step 2: Adjust signal generator to $f_0$.

Step 3: Set waveguide attenuator to 2.5 dB and adjust RF input until tube output is saturated.

Step 4: Adjust modulation circuit to increase the input power by 1 dB.

Step 5: Readjust the waveguide attenuator to 3 dB.

Step 6: Adjust network analyzer to 0° phase shift.

Step 7: Modulate the carrier and read the change in phase.

Step 8: Set waveguide attenuator to 1 dB. Repeat Steps 6 and 7.

Step 9: Repeat Step 8 in 1 dB increments from -2 dB to -8 dB input drive. Record. This change in phase shall be less than 3.5°/dB.

4.16 Time Delay Distortion (Test equipment per Figure 8)

Step 1: Check the test set up for proper operation as follows:

(a) Connect RF input and output arms together.

(b) Adjust test oscillator frequency to 1.388 MHz ± 10 KHz.

4.16 Time Delay Distortion (Test equipment per Figure 8) Cont'd

(c) Observe on an oscilloscope with adequate bandwidth the wave form of Channel "B" of Vector Voltmeter. Adjust bias battery if necessary for undistorted sine wave.

(d) Set signal generator to $f_0$. Adjust Channel "A" and Channel "B" (on Vector Voltmeter) amplitude levels so that the two signals are within 10 dB of each other.

(e) Check to make sure signal level is great enough to cause the Vector Voltmeter to phase lock.

Step 2: Adjust vertical channel of recorder for 2 nanoseconds per inch and adjust horizontal channel of recorder for a sweep range of $f_3$ to $f_4$.

Step 3: Reconnect the input and output RF arms to the TWTA. Apply nominal input voltage and command signal

Step 4: Adjust input level such that the RF output power level is in the linear region below saturation and Vector Voltmeter is phase locked.

Step 5: Sweep the TWTA from $f_3$ to $f_4$ and record change in time delay on graph paper.

Step 6: The time delay over the range of $f_1$ to $f_2$ shall be a maximum of 0.10 ns/MHz at any 10 MHz interval over the linear portion of the curve and 0.01 ns/MHz$^2$ over the parabolic portion. Check. Attach graph to data sheets.

4.17 Stability (Mismatch)

Step 1: Connect the TWTA as outlined in Figures 1 and 9. Apply nominal operating voltages. Set power meter to the lowest range. Set spectrum analyzer to a convenient level.

Step 2: With the load connected to the TWTA output and the short and line stretcher connected to the input, vary the line stretcher. There shall be no power output indicated other than inherent noise.

4.17 Stability (Mismatch) (Cont'd)

Step 3: Repeat Step 2 with the short removed from the line stretcher.

Step 4: Repeat Steps 2 and 3 with the load, line stretcher and short connected as in Figure 9. There shall be no power output indicated other than inherent noise. Check.

4.18 Spurious Output (Coherent Components)

Step 1: Connect the TWTA as outlined in Figures 1 and 10 except connect Box 2 (Ref. Figure 3) to the TWTA output. Apply nominal voltage and the command signal.

Step 2: Adjust the signal generator to $f_o$ and adjust the RF input drive to a level equal to saturation +2 dB. Note the RF output power.

Step 3: Remove command signal and remove the output arm (Box 2). Connect the RF harmonic measuring arm (Figure 10) and apply command signal.

Step 4: Note the harmonic output power. The harmonic output power shall be a minimum of 10 dB below the fundamental power noted in Step 2. Record.

4.18.1 Incoherent Components

Step 1: Connect the TWTA as outlined in Figures 1 and 11. Apply nominal voltage and the command signal.

Step 2: Set sweep oscillator to $f_o$ and adjust RF input drive level to produce saturated output power.

Step 3: Adjust input to spectrum analyzer to 0 dBm.

Step 4: Set spectrum analyzer vertical display to log, IF bandwidth to 10 KHz, spectrum width to 1 MHz and input attenuation to 10 dB.

Step 5: Set input signal level to 0 dB line on scope graticule using IF attenuator.

Step 6: Tune spectrum analyzer through the frequency range of 7.25 GHz to 8.4 GHz. There shall be no non-harmonic component appearing above the -60 dB graticule. Check.

4.18.2 Spurious Output (AM)

Step 1: To calibrate equipment for AM measurement, set up equipment as shown in Figure 12.

Step 2: Set signal generator frequency to $f_0$ and adjust input to spectrum analyzer to 0 dbm.

Step 3: Set spectrum analyzer IF bandwidth to 1 KHz, spectrum width to 100 KHz/cm.

Step 4: Set signal generator to external amplitude modulation.

Step 5: Set audio oscillator frequency to approximately 100 KHz and adjust modulation signal until level of side bands is 30 db below the carrier level.

Step 6: Increase audio-oscillator attenuation by 10 db. Side band levels should drop 10 db on spectrum analyzer. Insert 10 db more attenuation. Side band level should now be 50 db below carrier level.

Step 7: Disconnect spectrum analyzer and connect H.P. 310A wave analyzer.

Step 8: Tune wave analyzer to modulation signal (approximately 100 KHz). Set mode switch to normal, bandwidth at 1000 Hz, peak wave analyzer to maximum meter reading. Note this reading (which is the maximum allowable for determining compliance).

Step 9: Disconnect modulation input to signal generator. Turn amplitude modulation to off.

Step 10: Conduct spurious search of signal generator up to 1.0 MHz. Note level and frequency of any spurious detected.

Step 11: Set up equipment and connect the TWTA as shown in Figure 13. Apply nominal input voltage and apply command signal.

Step 12: Saturate the TWTA at $f_0$. Adjust input to wave analyzer to 0 dbm.

Step 13: Using H.P. 302A wave analyzer, conduct spurious search of TWTA output through 20 KHz (mode switch to normal).

4.18.2 Spurious Output (AM) (Cont'd)

Step 14: Switch to H.P. 310A wave analyzer and conduct spurious search from 20 KHz to 1.0 MHz. There shall be no spurious signal which exceeds the level noted in Step 8, discounting any spurious noted in Step 10. Check.

4.18.3 Spurious Output (PM)

Step 1: To calibrate equipment for PM measurement, set up equipment as shown in Figure 14.

Step 2: Set signal generator frequency to $f_o$ and adjust input to spectrum analyzer to 0 dBm.

Step 3: Set spectrum analyzer IF bandwidth and spectrum width for convenient display.

Step 4: Set signal generator to external FM modulation. Set test oscillator to approximately 100 KHz and adjust modulation signal until side band level is 26 dB below carrier level.

Step 5: Increase test oscillator attenuation by 10 dB. Side band level should drop 10 dB on spectrum analyzer. Insert 10 dB more attenuation. Side band level should now be 46 dB below carrier level. Set side band level to 52 dB below carrier level, this equals a separation of 10 milliradians.

Step 6: Disconnect spectrum analyzer and connect signal generator to H.P. 310A through discriminator.

Step 7: With mode switch to normal and bandwidth set to 1.0 KHz, tune wave analyzer to modulation frequency (Approximately 100 KHz) and peak frequency to maximum meter reading. Peak discriminator frequency for maximum meter reading. Note this reading (which is the maximum allowable for determining compliance).

Step 8: Disconnect modulation input to signal generator. Turn modulation selector switch to CW.

Step 9: Using H.P. 302A wave analyzer, conduct a spurious search of the signal generator spectrum from 100 Hz to 20 KHz. Note level and frequency of any spurious detected.

4.18.3 Spurious Output (PM) (Cont'd)

Step 10: Using H.P. 310A wave analyzer, conduct a spurious search of the signal generator spectrum from 20 KHz to 1.0 MHz. Note level and frequency of any spurious detected.

Step 11: Set up equipment and connect the TWTA as shown in Figure 15. Apply nominal input voltage and command signal.

Step 12: Saturate TWTA at $f_o$ and adjust input to wave analyzer to 0 dBm.

Step 13: Reapply 100 KHz modulation to signal generator. Peak discriminator-detector and wave analyzer frequency for maximum meter reading. Disconnect modulation. Turn modulation selector switch to C.W.

Step 14: Using H.P. 302A conduct spurious search of TWTA output from 100 Hz to 20 KHz. Note level and frequency of any spurious signal. There shall be none which exceeds the level noted in Step 7. Discount spurious signals noted in Step 9. Check.

Step 15: Using H.P. 310A conduct spurious search of TWTA output from 20 KHz to 1.0 MHz. Note level and frequency of any spurious signal. There shall be none which exceeds the level noted in Step 7. Discount spurious signals noted in Step 10. Check.

Step 16: Deleted

## 5.0 VIBRATION TEST

During this test the TWTA shall be operating. DC input currents and RF output shall be monitored. Vibration shall be applied in each of three orthogonal axes.

### 5.1 Test Levels

| | |
|---|---|
| Random Spectrum | 20 - 300 cps; increase at 3 db/oct to 0.25 $g^2$/cps |
| | 300 - 1200 cps; constant 0.25 $g^2$/cps |
| | 1200 - 2000 cps; decrease at 6 db/oct |
| | (Overall Level = 19.5 grms) |

Test Duration -- 3 minutes/axis

### 5.2 Procedure

A bare fixture random equalization will be performed prior to mounting the TWTA. An on-line scanner output plot from the automatic analyzer/equalizer will be made during each axis of test and attached to the data sheets. This plot will be used to verify conformance with the vibration criteria. The filter bandwidth of the analyzer/equalizer will be 50 Hz or less. Applying the random spectrum in separate parts by breaking up the specified spectrum into narrow bands is not acceptable.

Prior to performance of any vibration test the vibration fixture shall have been evaluated in accordance with Paragraph 3.8.

Step 1: The TWTA shall be attached to the vibration fixture at its normal mounting points. The vibration fixture shall then be mounted to the shaker head so that vibration is perpendicular to the TWTA mounting base (ref. Figure 17). The control accelerometer shall be mounted on the vibration fixture as close as possible to the TWTA point(s) of attachment.

Step 2: Connect the TWTA as outlined in Figure 16. Apply nominal input voltage and apply the command signal to the TWTA.

5.2 Procedure (Cont'd)

Step 3: Adjust the signal generator to $f_o$ and adjust RF input power to produce saturated output power. Record the RF output power and the telemetry voltages.

Step 4: Record DC input current; calculate DC input power.

Step 5: Vibrate the TWTA at the levels and for the time duration specified in Paragraph 5.1. During vibration the RF power output and DC input current shall be monitored for any abnormalities.

Step 6: Repeat Step 5 with the TWTA operating, except change the TWTA axis of vibration to the major horizontal axis (ref. Figure 18).

Step 7: Repeat Step 5 with the TWTA operating, except change the TWTA axis of vibration to the minor horizontal axis (ref. Figure 18).

Step 8: Repeat Steps 3 and 4.

Step 9: Remove the TWTA from the vibration fixture and inspect for any evidence of mechanical damage.

## 6.0 THERMAL VACUUM TEST

Unless otherwise specified, RF data taken at the start of and during thermal vacuum testing will be used as a reference only. Delta changes will be used to determine compliance to specification limits.

Prior to the start of testing the signal generator and power meters shall have been in operation a minimum of 24 hours.

Notes

1. Temperature stabilization is defined as the thermal base plate remaining within the specified temperature ± 5°F for 30 minutes.

2. Changes from one temperature condition to another shall be accomplished at a rate not to exceed 10°F/ minute.

3. The change in small signal gain shall not exceed 0.15 db/15°F.

4. The following method shall be used to determine compliance to specification limits. Results shall be recorded on the data sheets.

   A. Determine the maximum delta decrease in RF power output that may occur from the reference data recorded in Step 2. Subtract this value from the RF power output determined during the pre-environmental functional test. The corrected RF power output shall be a minimum of 43 dbm.

   B. Determine the maximum delta changes in saturated and small signal gain that may occur from the reference data recorded in Step 2. These values shall be added or subtracted as applicable to the gain values determined during the pre-environmental functional test. The corrected gain shall meet the requirements of Paragraphs 4.6 and 4.10.

   C. X-Y plots of power output variation, gain flatness and gain slope performed at temperature extremes shall be compared to the reference data of Step 2. Any delta change shall not exceed the applicable specified limits.

Step 1: Attach the TWTA to a thermal base plate and install in the vacuum chamber. Connect the TWTA as outlined in Figure 17.

Step 2: Apply nominal input voltage and command signal. Perform the following tests at ambient temperature and pressure:

   (a) Paragraph 4.4, Inrush Characteristics

   (b) Paragraph 4.6, Saturated Power Output and Gain (Note 4)

   (c) Paragraph 4.7, Saturated Power Output, Saturated Gain and Input Power Versus Input Voltage.

6.0 Thermal Vacuum Test (Cont'd)

(d) Paragraph 4.8, Saturated Power Output Variation (Note 4)

(e) Paragraph 4.9, Gain Flatness (Note 4)

(f) Paragraph 4.10, Small Signal Gain and Gain Flatness (Note 4)

Step 3: With the TWTA operating at $f_o$ and at small signal (input drive 20 db below that required for saturation) lower the chamber pressure to 1 X 10-5 mmHg or less. During evacuation the RF power output and DC input current shall be monitored for any abnormalities. Temperature of the thermal base plate may be 60 ± 15°F during this period.

Step 4: When evacuation of the chamber is completed and the thermal base plate stabilized at +60°F, record the small signal gain at $f_o$. (Note 3)

Step 5: Increase the thermal base plate temperature to + 100°F and stabilize. After stabilization record the small signal gain at $f_o$ (Note 3). Calculate change in gain as follows:

$$\frac{|G_{T_1} - G_{T_o}|}{40} \times 15 = \text{db}/15^\circ\text{F}$$

Where $T_1$ = + 60°F and $T_o$ = + 100°F

Step 6: Increase the thermal plate to +140°F and stabilize. After stabilization record the small signal gain at $f_o$ (Note 3). Calculate change in gain as follows:

$$\frac{|G_{T_2} - G_{T_o}|}{40} \times 15 = \text{db}/15^\circ\text{F}$$

Where $T_2$ = + 140°F and $T_o$ = + 100°F

Step 7: Deleted

Step 8: With the TWTA still operating, maintain the thermal base plate temperature at +140°F for six (6) hours. During this period, after approximately four (4) hours repeat the tests of Step 2.

Step 9: Lower the thermal base plate temperature to +60°F (stabilization not required) at +60°F remove the command signal.

Step 10: With the command signal still removed lower the thermal base plate to -10°F (stabilization not required). At -10°F apply the command signal and simultaneously raise the temperature to +60°F. The TWTA shall turn on within 90 ± 30 seconds, Check.

Step 11: With the TWTA operating, maintain +60°F for six (6) hours. During this period, after approximately four (4) hours repeat the tests of Step 2.

6.0 Thermal Vacuum Test (Cont'd)

Step 12: With the TWTA operating, increase the thermal base plate temperature to +140°F. During the temperature increase, at 105°F (stabilization not required), remove command signal and then reapply, TWTA shall turnon within 90 ± 30 seconds, Check. With the TWTA operating, maintain +140°F for six (6) hours. During this period, after approximately four (4) hours repeat the tests of Step 2, except items (a) and (c); Item (f) shall be performed at nominal input voltage.

Step 13: Repeat the sequence of Steps 9 through 12 twice, except Step 2, Items (a) and (c); Item (f) shall be performed at nominal input voltage.

Step 14: Repeat the sequence of Steps 9 through 11 once, except Step 2 Items (a) and (c); Item (f) shall be performed at nominal input voltage.

Step 15: Return the TWTA to room ambient conditions.

7.0 FINAL FUNCTIONAL TEST

Repeat Paragraphs 4.1 through 4.18 except Paragraph 4.2.

7.1 Final Mechanical and Visual Inspection

Mechanical and visual inspection shall be performed to determine compliance to B200350-500.

## 8.0 BURN-IN (FLIGHT MODELS EXCEPT FIRST THREE)

Burn-in shall be performed in accordance with Paragraph 3.11 and functional tests performed as follows:

| Functional Test Sequence | Test Paragraph (Note 1) |
|---|---|
| Start of burn-in | 8.1, 4.1 |
| At 336 hours | 4.2 through 4.18 |

Note 1: Test indicated shall be performed at about ± 10% of the time interval specified.

### 8.1 Functional Tests (Burn-in)

The following parameters shall be recorded at the specified time interval. Data shall be reviewed for any abnormalities.

a. Telemetry voltages
b. Saturated power output at 7.5 GHz ± 100 MHz

## 9.0 VIBRATION TEST

During this test the TWTA shall be operating; DC input currents and RF output shall be monitored. Vibration shall be applied in each of three orthogonal axes.

### 9.1 Test Levels

Random Spectrum

20-300Hz; increase at 3 db/octave to 0.0625 $g^2$/Hz
300-1200Hz; constant 0.0625 $g^2$/Hz
1200-2000Hz; decrease at 6 db/octave (overall level = 9.8 gRMS)
Test Duration -1 minute/axis

### 9.2 Procedure

Test procedure per paragraph 5.2 except change steps as follows:

Step 3: Delete in entirety and replace with following.

Adjust the signal generator to $f_o$ and adjust the RF input power to level 20db below saturation; record the small signal gain. Readjust the RF input power to produce saturated power output; record power output and telemetry voltages.

Step 7: Delete in entirety and replace with following:

9.2 Procedure

Step 7: (Continued)

Repeat Step 5 except with the TWTA operating at small signal and change the TWTA axis of vibration to the minor horizontal axis (ref. Figure 18).

10.0 THERMAL VACUUM TEST

Unless otherwise specified, RF data taken during thermal vacuum testing will be used as reference only. Delta changes will be used to determine compliance to specification limits.

Prior to the start of testing the signal generator and power meters shall have been in operation a minimum of 24 hours.

Notes

1. Temperature stabilization is defined as the thermal base plate remaining within the specified temperature ± 5°F for 30 minutes.
2. Changes from one temperature condition to another shall be accomplished at a rate not to exceed 10°F/minute.
3. The change in small signal gain shall not exceed 0.15 db/15°F.
4. The following method shall be used to determine compliance to specification limits. Results shall be recorded on the data sheets.

   A. Determine the maximum delta decrease in RF power that may occur from the data recorded in Step 3. Subtract this value from the RF power output determined during the pre-environmental functional test. The corrected RF power output shall be a minimum of 43 dbm.

   B. Determine the maximum delta changes in small signal gain that may occur from the data recorded in Step 3. These values shall be added or subtracted as applicable to the gain values determined during the pre-environmental functional test. The corrected gain shall meet the requirements of Paragraph 4.10.

   C. X-Y plots of power output, gain flatness and gain slope shall be compared to the data of Step 3. Any delta change shall not exceed the applicable specified limits.

Step 1: Attach the TWTA to a thermal base plate and install in the vacuum chamber. Connect the TWTA as outlined in Figure 17.

Step 2: Apply nominal input voltage and command signal. Perform the tests of Paragraph 4.10 (small signal gain and gain flatness) at nominal input voltage and at ambient temperature and pressure.

Step 3: With the TWTA nonoperating, evacuate chamber to $1 \times 10^{-5}$ mm Hg or less and adjust base plate temperature to + 60°F. After stabilization has been reached, turn TWTA on and maintain for six (6) hours minimum. During this period perform the following tests:

10.0 THERMAL VACUUM TEST Step 3: (Continued)

a) Paragraph 4.4, Inrush Characteristics
b) Paragraph 4.6, Saturated Power Output and Gain
c) Paragraph 4.7, Saturated Power Output, Saturated Gain and Input Power versus Input Voltage.
d) Paragraph 4.8, Saturated Power Output Variation
e) Paragraph 4.9, Gain Flatness
f) Paragraph 4.10, Small Signal Gain and Gain Flatness.

Record the small signal gain at $f_o$ at nominal input voltage.

Step 4: Deleted

Step 5: Increase the thermal base plate temperature to +100°F and stabilize. After stabilization record the small signal gain at $f_o$ with nominal input voltage applied. (Note 3)

From the data of step 3 calculate change in gain as follows:

$$\frac{|GT_1 - GT_o|}{40} \times 15 = \text{db}/15^\circ\text{F}$$

where $T_1 = 60^\circ$F and $T_o = 100^\circ$F

Step 6: With the TWTA still operating, increase the thermal base plate temperature to +146°F and maintain for a minimum of six (6) hours. During this period, after stabilization repeat the tests of step 3 and the following paragraphs:

| | |
|---|---|
| Para 4.13 | Intermodulation Distortion |
| Para 4.18.1 | Spurious Output (Incoherent Components) |
| Para 4.18.2 | Spurious Output (AM) |
| Para 4.18.3 | Spurious Output (PM) |

Record the small signal gain at $f_o$ at nominal input voltage. (Note 3)

From the data of step 5 calculate change in gain as follows:

$$\frac{|GT_2 - GT_o|}{46} \times 15 = \text{db}/15^\circ\text{F}$$

where $T_o = 146^\circ$F and $T_o = 100^\circ$F

Adjust DC input voltage to 33 ± .5 Vdc. While observing the helix current telemetry vary the RF input drive from saturation to low drive to determine the maximum helix current telemetry, then vary the frequency from $f_1$ to $f_2$ to determine any further increase in helix current telemetry. At the point of maximum helix current telemetry record the following:
DC Input Current
DC Input Voltage
Helix Current Telemetry Voltage
Calculate Primary Power (Maximum 103 Watts)

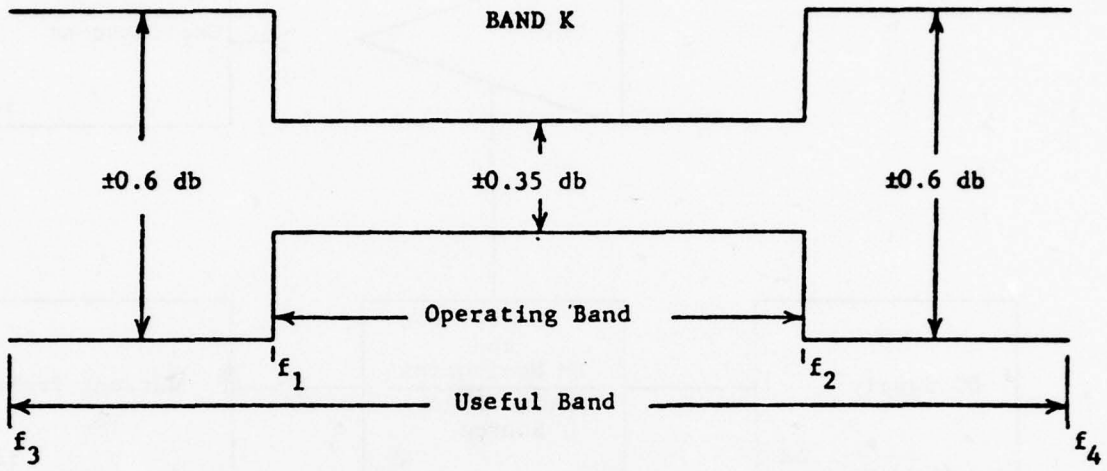
Step 7: Turn the TWTA off and then return to room ambient conditions.

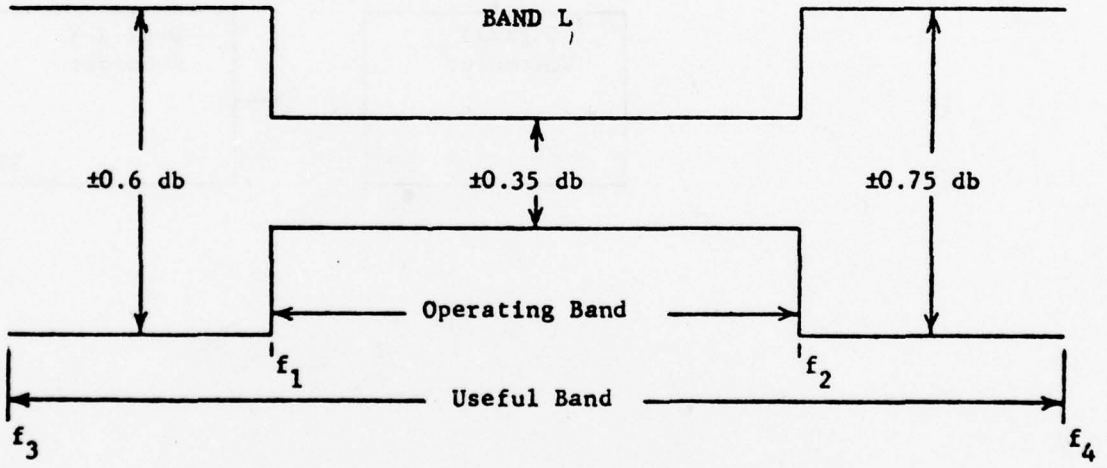
11.0 FINAL FUNCTIONAL TEST

Repeat Paragraphs 4.1 through 4.18 except Paragraph 4.2

11.1 Final Mechanical and Visual Inspection

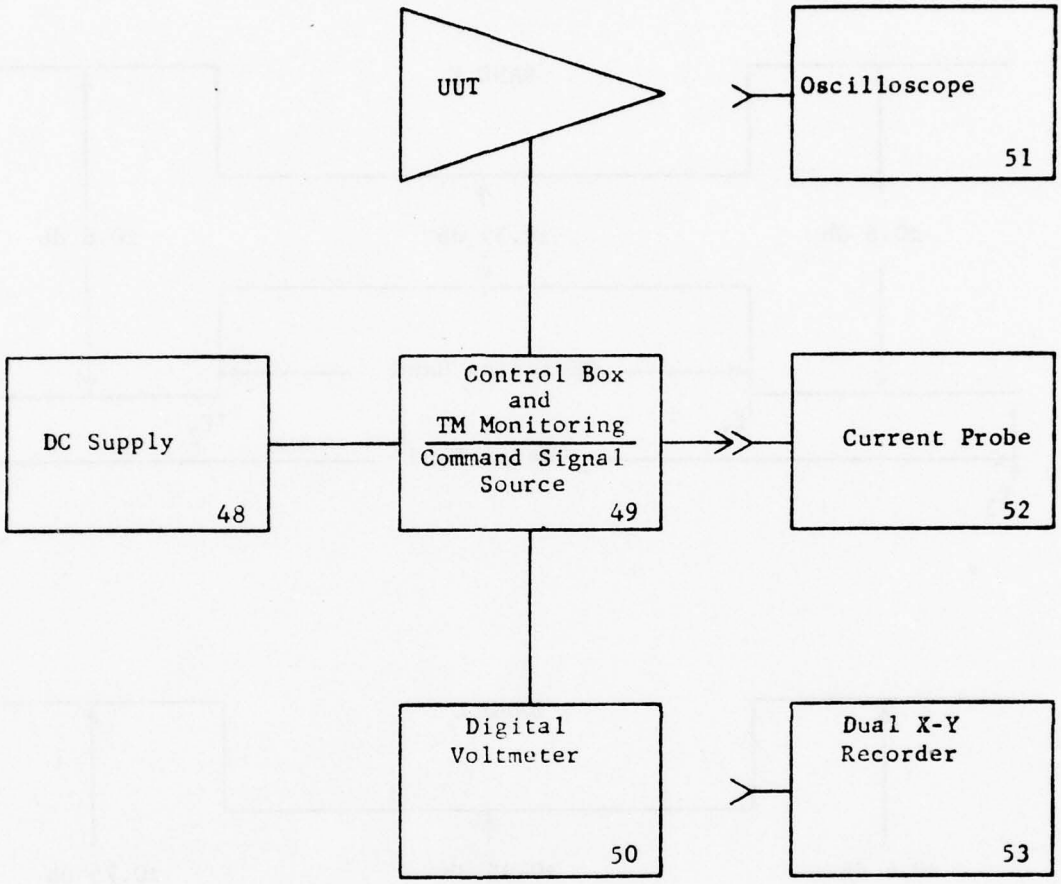
Mechanical and visual inspection shall be performed to determine compliance to B200350-500.



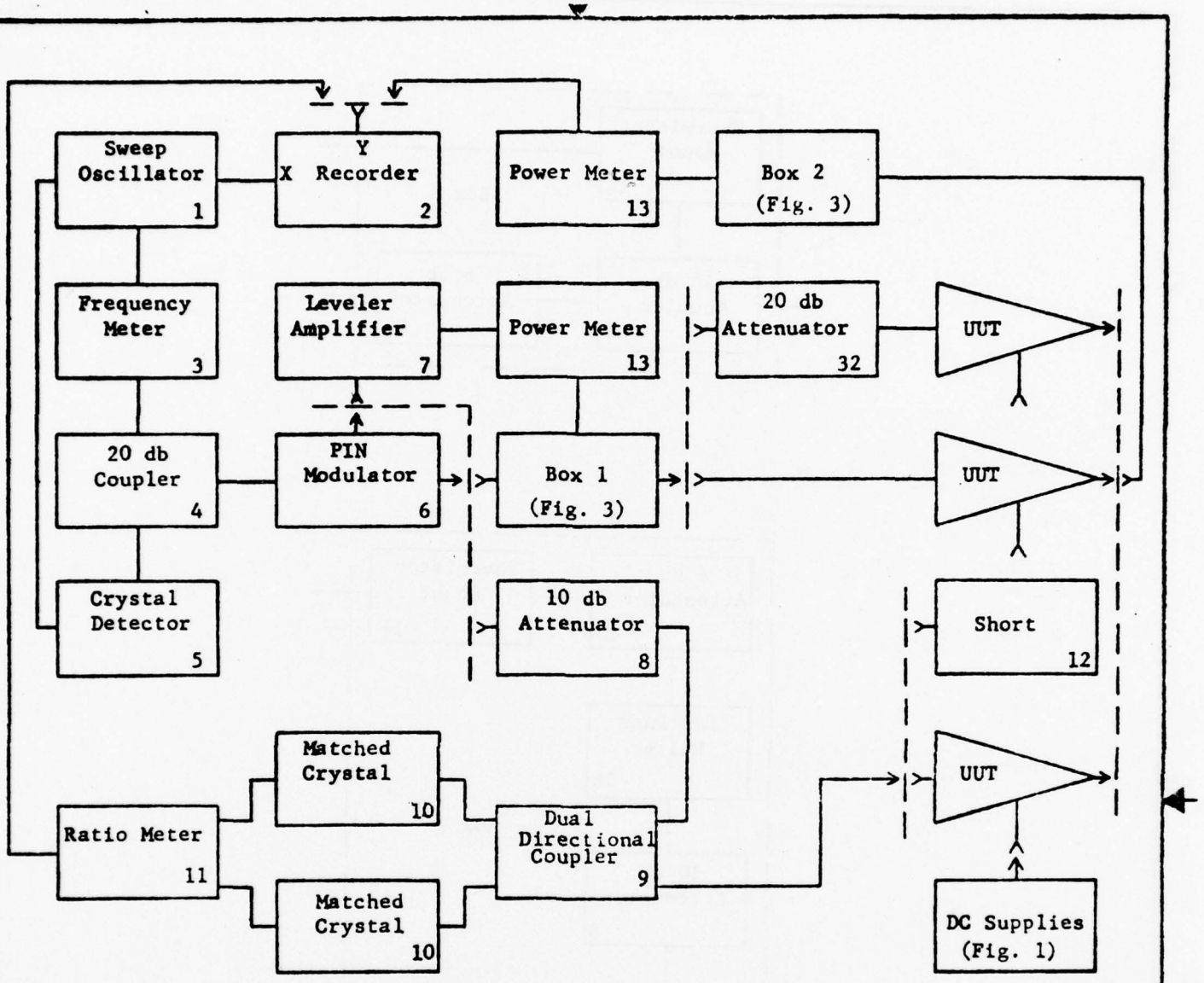

GAIN FLATNESS

FIGURE A



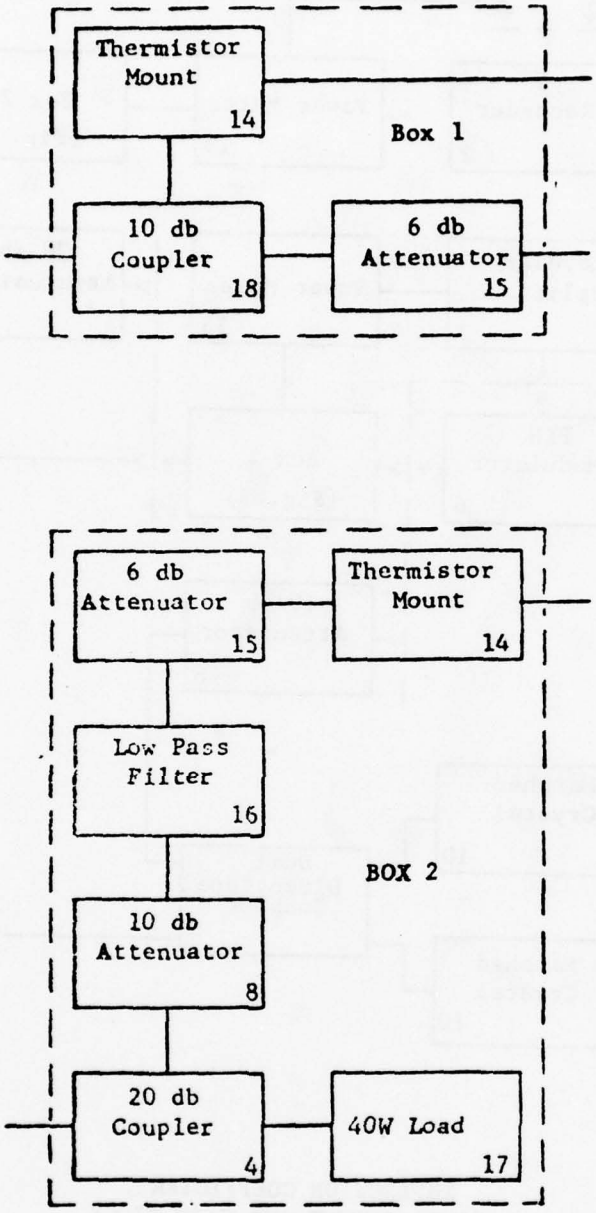

SUPPLY AND CONTROL BLOCK

FIGURE 1




REFLECTION COEFFICIENT,
POWER OUTPUT AND GAIN BLOCK

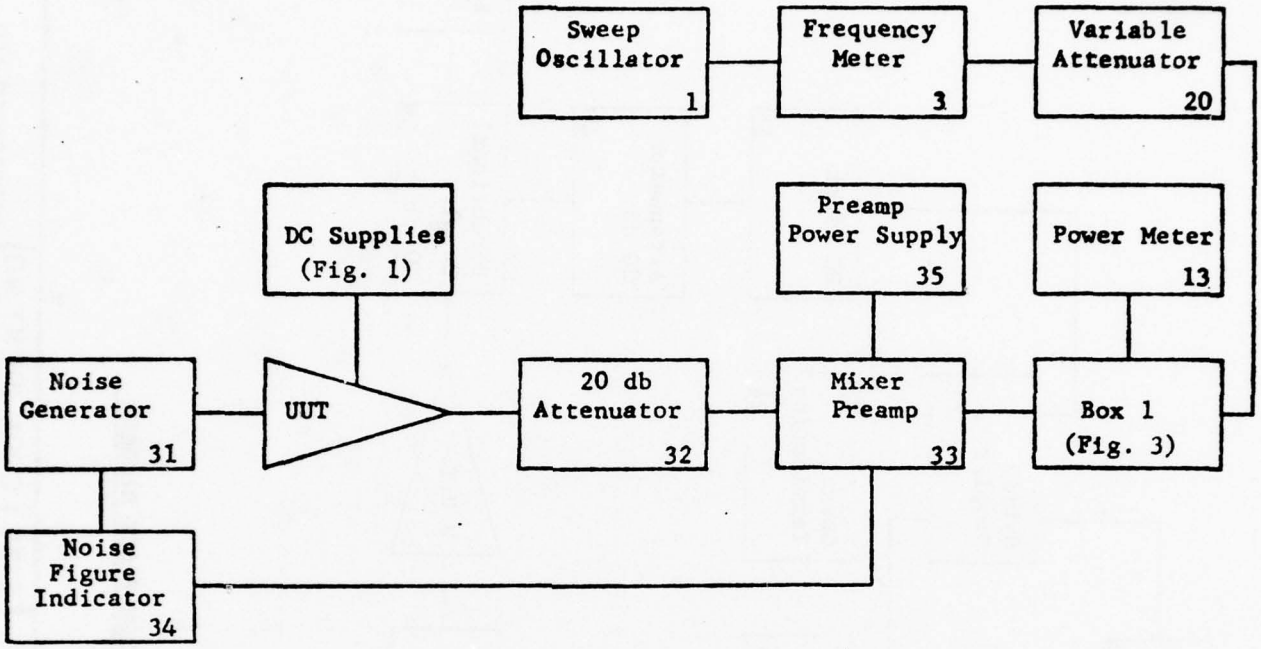
FIGURE 2




TEST BLOCK SEGMENTS

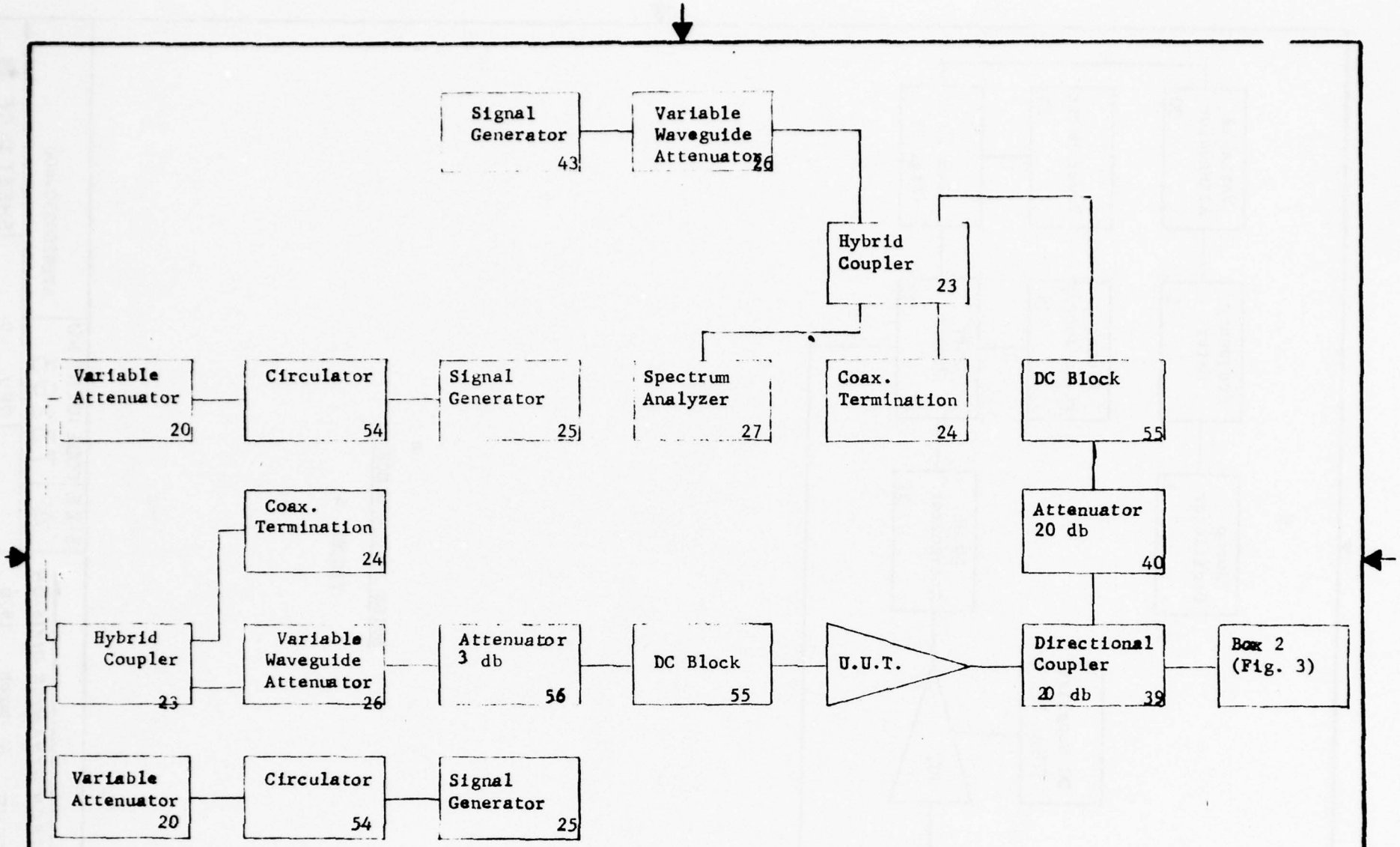
BOXES 1 and 2

FIGURE 3



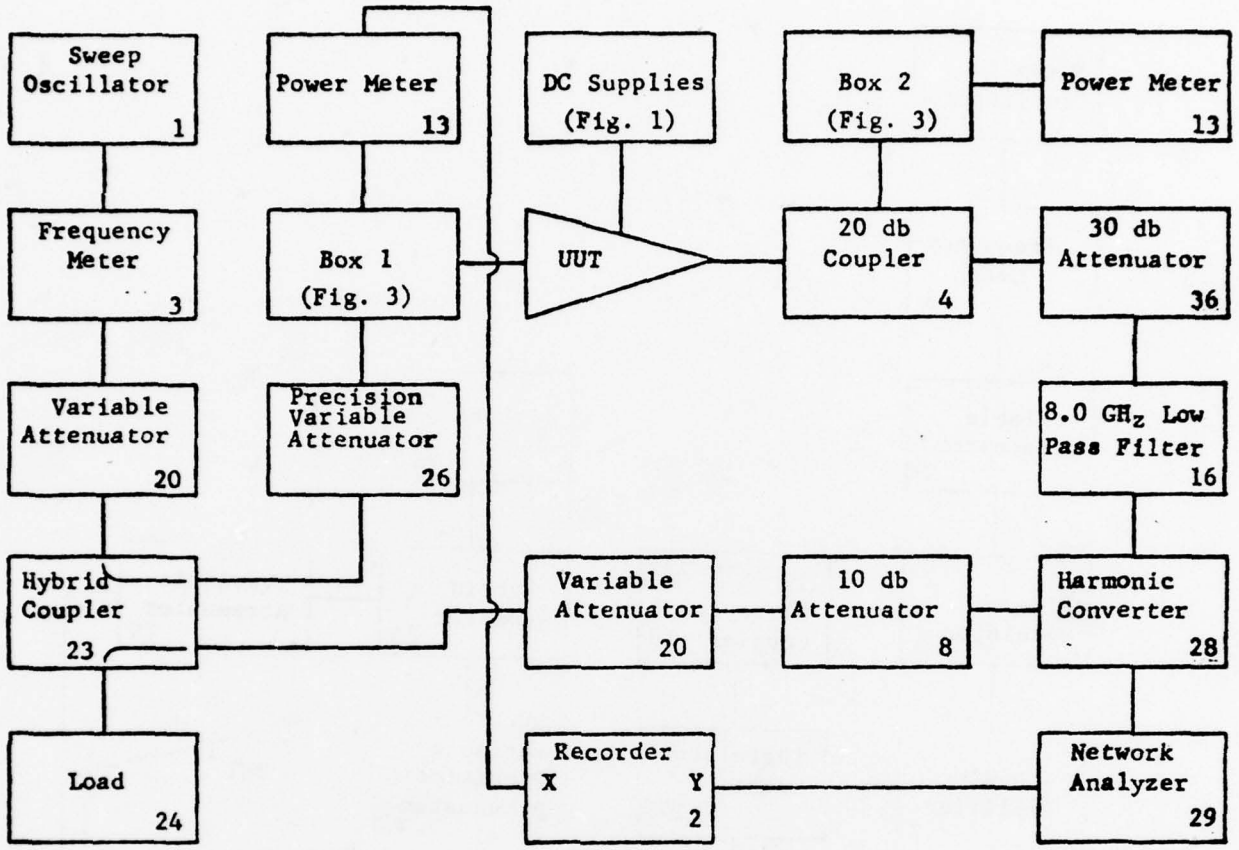

NOISE FIGURE BLOCK

FIGURE 4



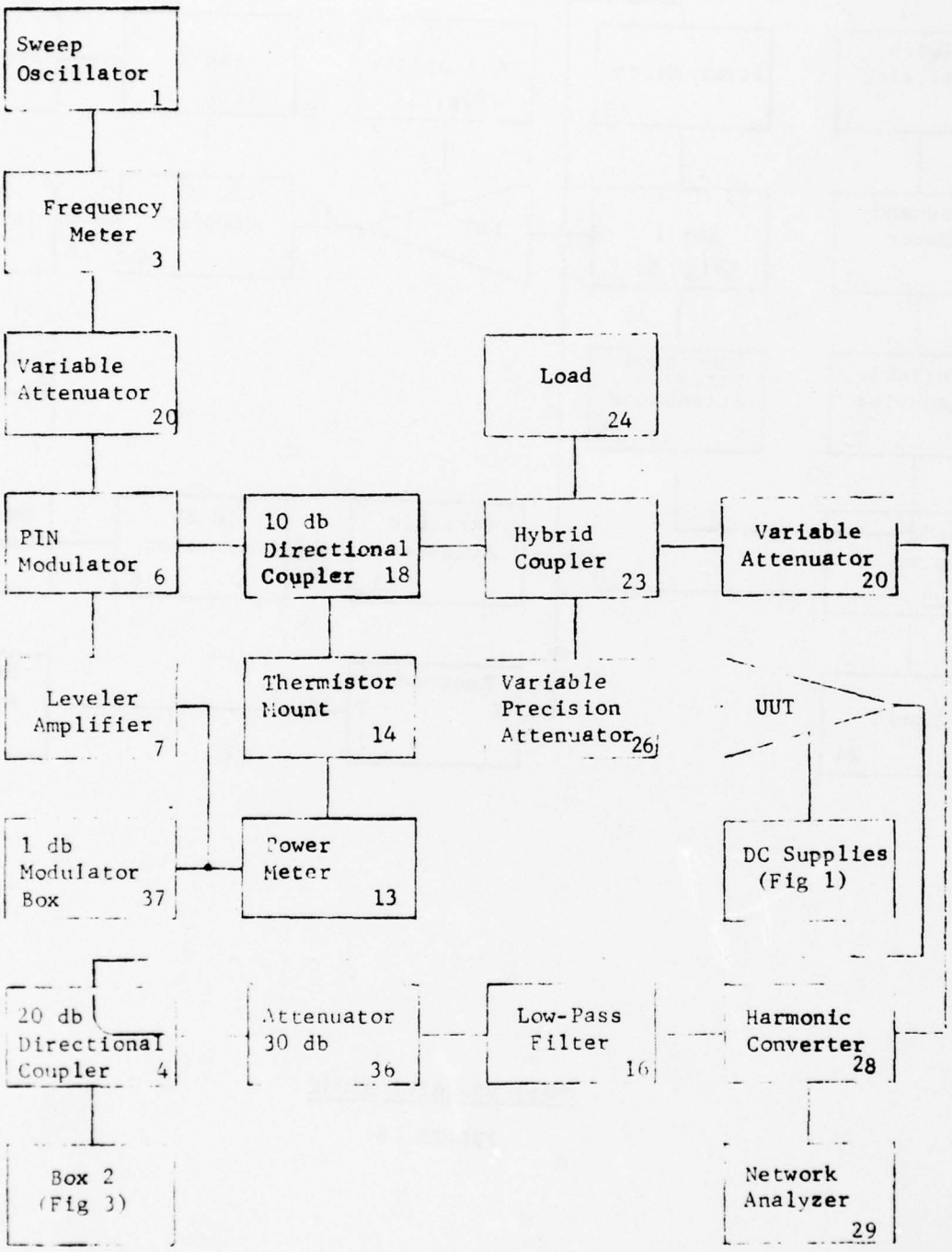

INTERMODULATION DISTORTION BLOCK DIAGRAM

FIGURE 5



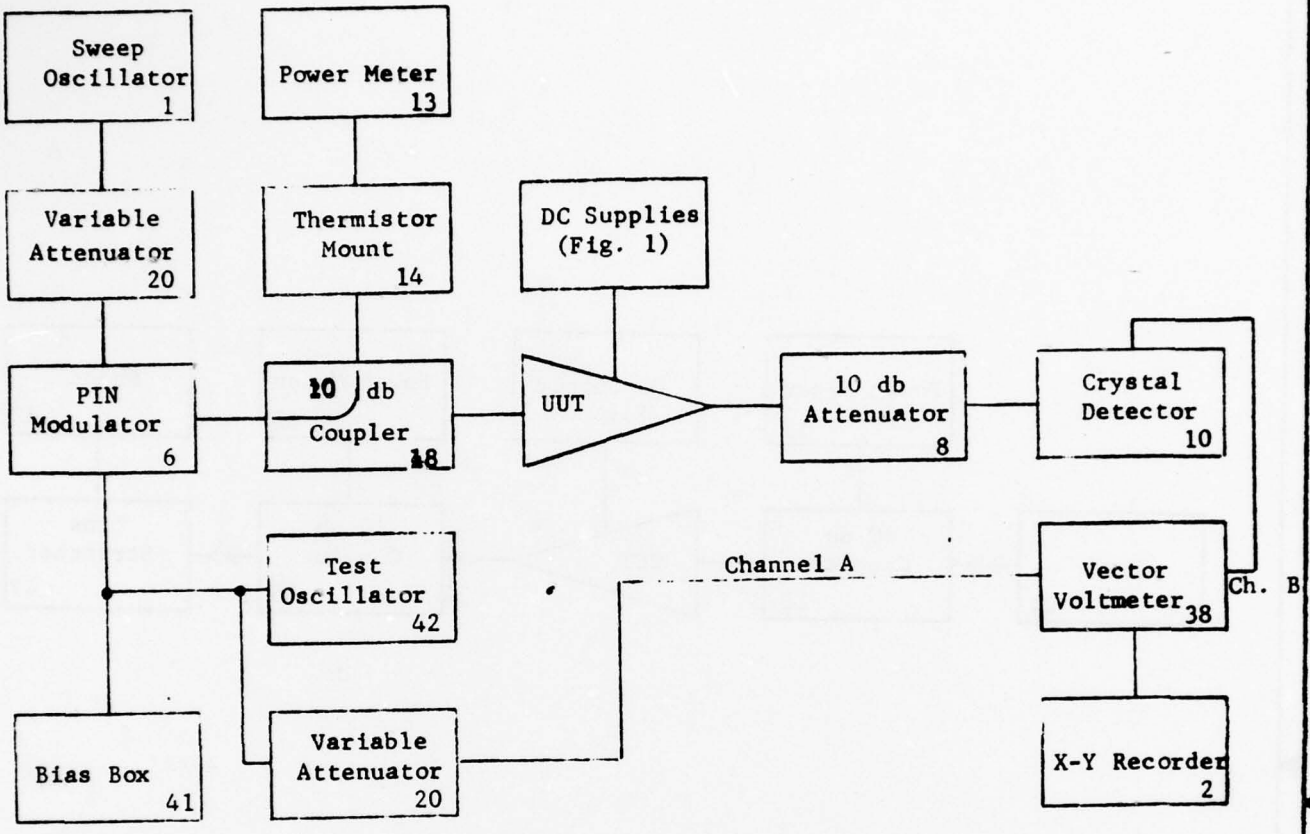

PHASE VS DRIVE BLOCK

FIGURE 6



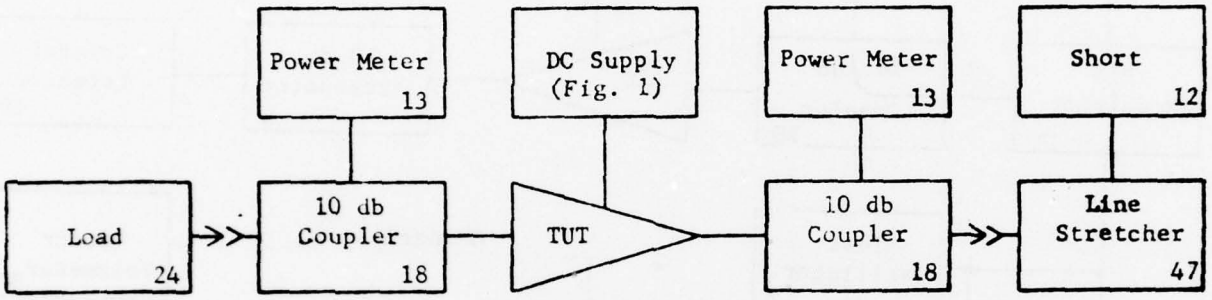

AM to PM Conversion Block

Figure 7



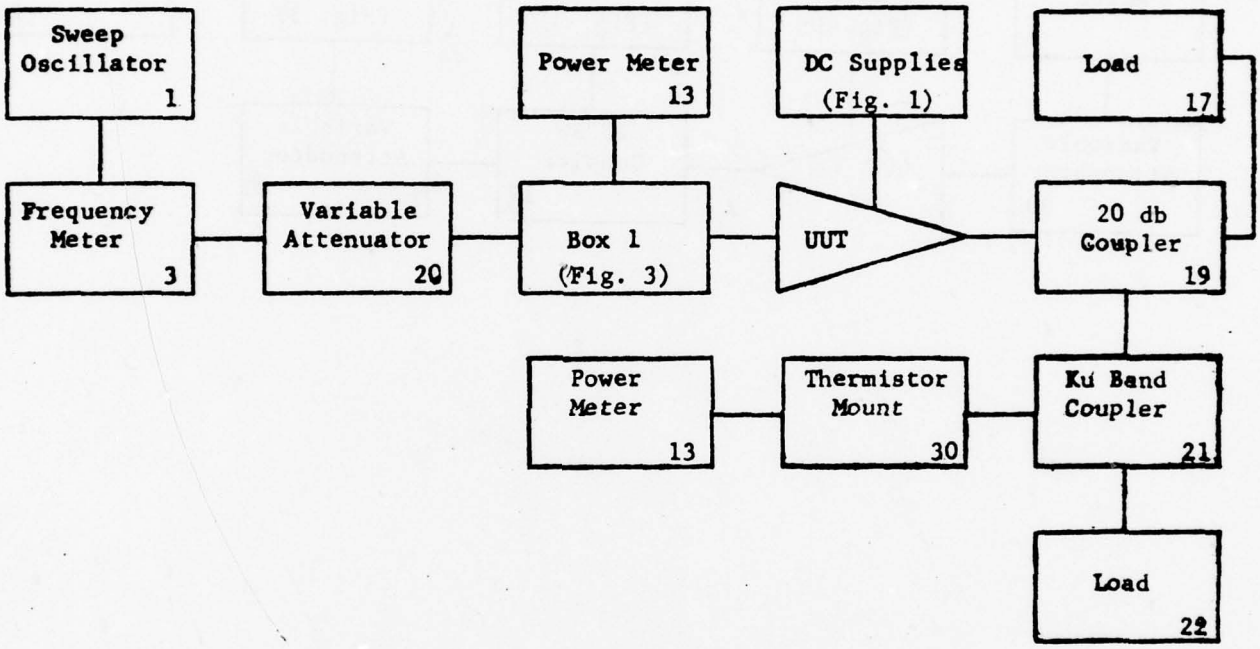

TIME DELAY DISTORTION BLOCK

FIGURE 8



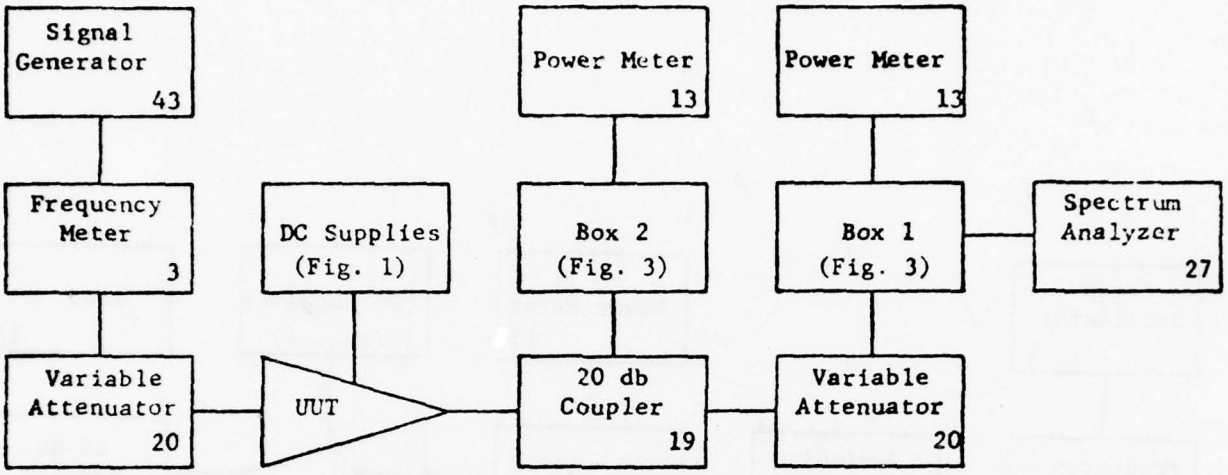

STABILITY BLOCK

FIGURE 9



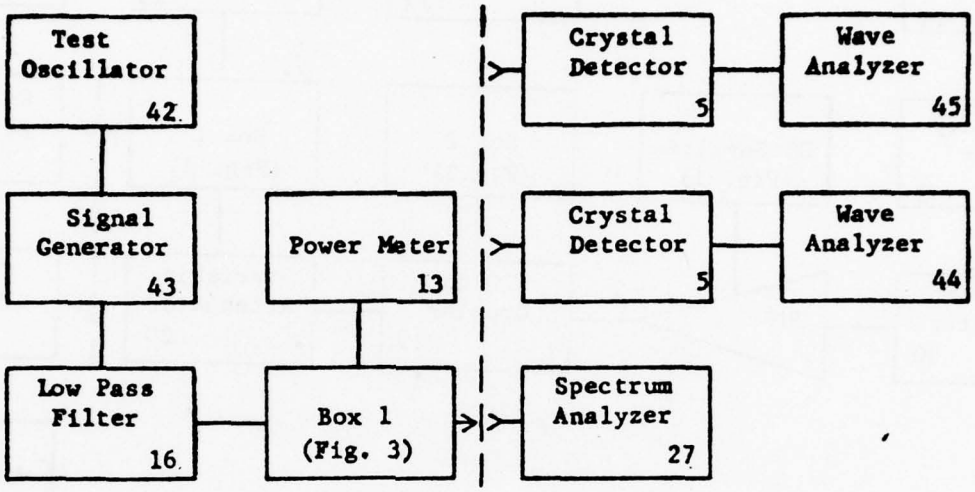

HARMONIC POWER BLOCK

FIGURE 10



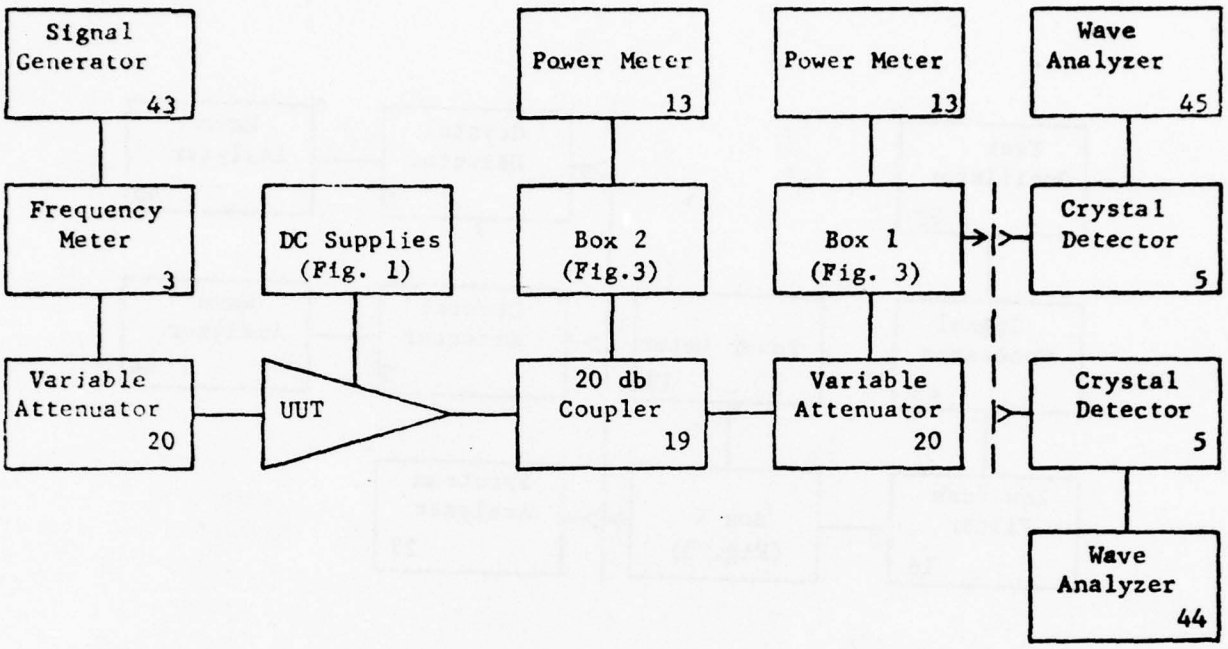

SPURIOUS OUTPUT
INCOHERENT COMPONENTS BLOCK

FIGURE 11



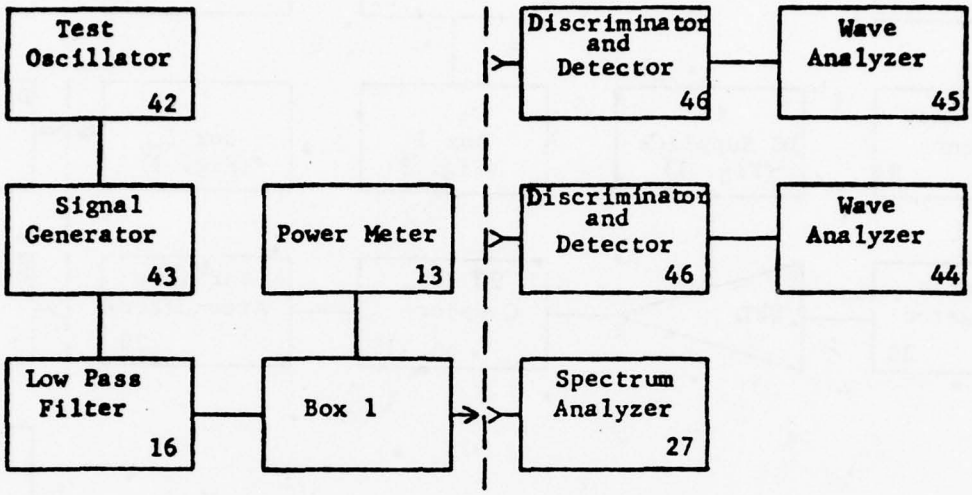

AM SPURIOUS OUTPUT
CALIBRATION BLOCK

FIGURE 12



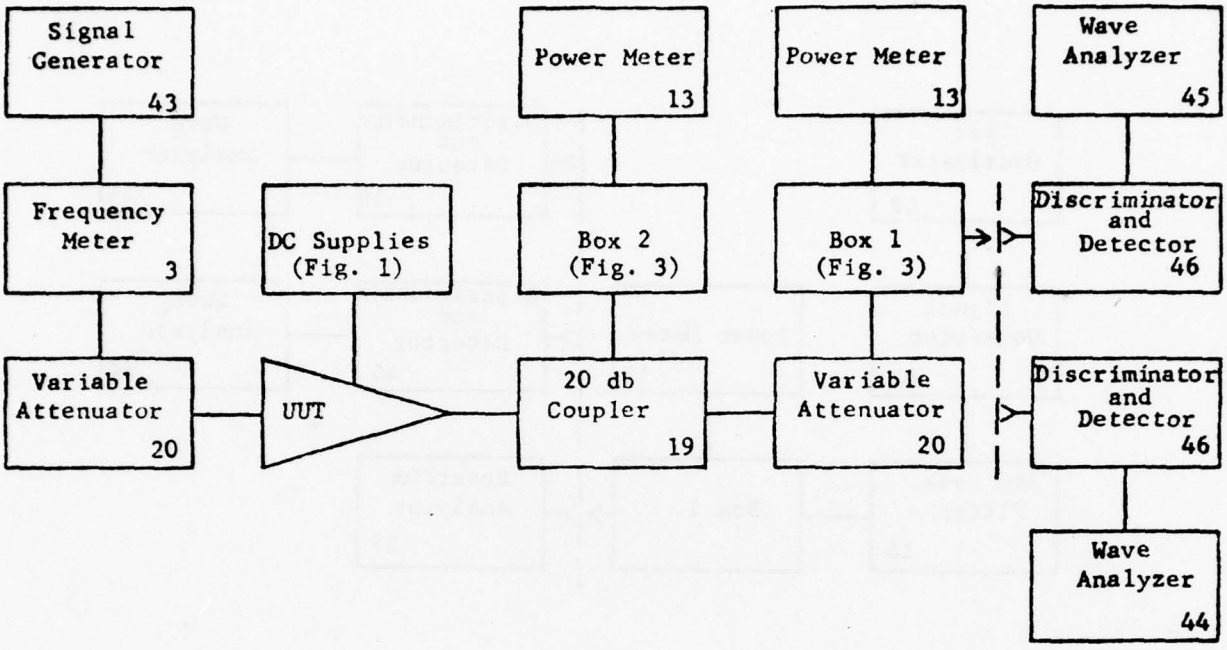

AM SPURIOUS OUTPUT
MEASUREMENT BLOCK

FIGURE 13




PM SPURIOUS OUTPUT
CALIBRATION BLOCK

FIGURE 14




PM SPURIOUS OUTPUT
MEASUREMENT BLOCK

FIGURE 15

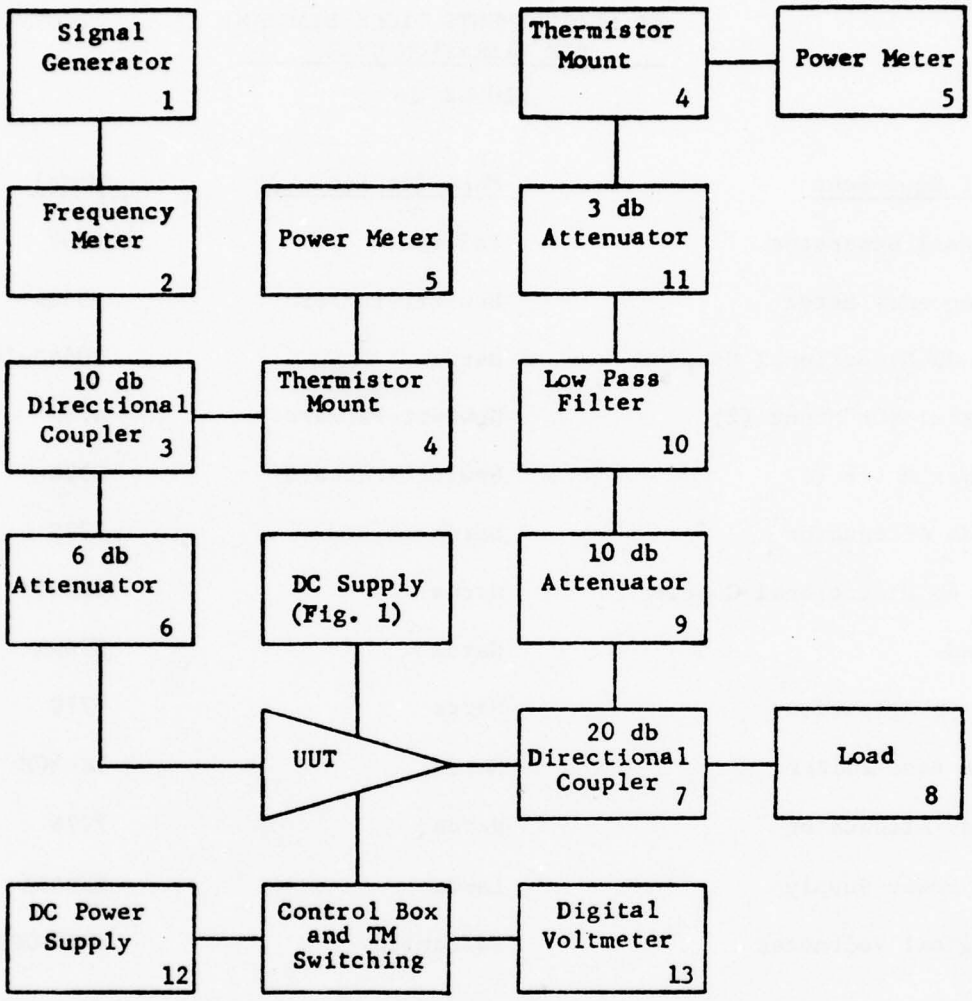
## RF TEST MEASUREMENTS BLOCK DIAGRAMS

### LIST OF EQUIPMENT

| Equipment | Make (or Equiv.) | Model (or Equiv.) |
|---|---|---|
| 1. Sweep Oscillator | H-P | RF Unit H01-8694B Series 8690 |
| 2. X-Y Recorder | H-P | 7035B |
| 3. Frequency Meter | H-P | 537A |
| 4. 20 db Directional Coupler | Narda | 3045C-20 |
| 5. Crystal Detector | Alfred | 1001 |
| 6. PIN Modulator | H-P | 8734A |
| 7. Invertor and Leveler Amplifier | HAC | |
| 8. 10 db Attenuator | Narda | 774-10 |
| 9. Dual Directional Coupler | Narda | 3024 |
| 10. Crystal | Alfred | 1001 Opti |
| 11. Ratio Meter | H-P | 416B |
| 12. Short (female) | Narda | |
| 13. Power Meter | H-P | 432A |
| 14. Thermistor Mount | H-P | 478A |
| 15. 6 db Attenuator | Narda | 757C-6 |
| 16. Low Pass Filter 8 $GH_z$ | Microlab | LA-80N |
| 17. High Power Load | Narda | 376NM |
| 18. 10 db Directional Coupler | Narda | 3034B-10 |
| 19. 20 db Directional Coupler | Narda | 4016-20 |
| 20. Variable Attenuator | PRD | C1110 |
| 21. 10 db Directional Coupler (Ku Band) | H-P | P752C |
| 22. Low Level Waveguide | H-P | P910A |
| 23. Coaxial Hybrid Coupler | Narda | 3034 |
| 24. Load | Weinschel | 535-MN |
| 25. Signal Generator | PRD | 1207 |

RF TEST MEASUREMENTS BLOCK DIAGRAMS - LIST OF EQUIPMENT (Cont'd)

| Equipment | Make (or Equiv.) | Model (or Equiv.) |
|---|---|---|
| 26. Precision Variable Attenuator | H-P | H382A |
| 27. Spectrum Analyzer | H-P | 8551B |
| 28. Harmonic Converter | H-P | 8411A |
| 29. Network Analyzer | H-P | 8410A |
| 30. Thermistor Mount | H-P | P486A |
| 31. Noise Generator (w/internal load) | A.I.L. | 07051 |
| 32. 20 db Attenuator | Narda | 777C-20 |
| 33. Mixer-Preamplifier | A.I.L. | 13507 |
| 34. Noise Figure Indicator | A.I.L. | 75 |
| 35. Preamplifier Power Supply | A.I.L. | 136 |
| 36. 30 db Attenuator | Narda | 777-30 |
| 37. 1 db Modulation Box | HAC | |
| 38. Vector Voltmeter | H-P | 8405A |
| 39. Directional Coupler 20 db | Narda | 3044-20 |
| 40. 20 db Attenuator | Narda | 757-20 |
| 41. Bias Box | HAC | |
| 42. Test Oscillator | H-P | 651A |
| 43. Signal Generator | H-P | 618B |
| 44. Wave Analyzer | H-P | 302A |
| 45. Wave Analyzer | H-P | 310A |
| 46. Discriminator/Detector | | |
| 47. Line Stretcher | General Radio | |
| 48. DC Power Supply | Lamda | LK343FM |
| 49. Control Box | HAC | |
| 50. Digital Voltmeter | Fairchild | 7000-OPT-1 |
| 51. Oscilloscope | Tektronix | 531A |
| 52. Current Probe | Tektronix | P6042 |
| 53. Dual X-Y Recorder | H-P | 136A |
| 54. Circulator | E & M Laboratory | X12T20 |
| 55. [illegible] Block | E/R/Microlab | HR-52[illegible] |
| 56. [illegible] db Attenuator | Narda | 757C-[illegible] |




RF MEASUREMENTS BLOCK DIAGRAM

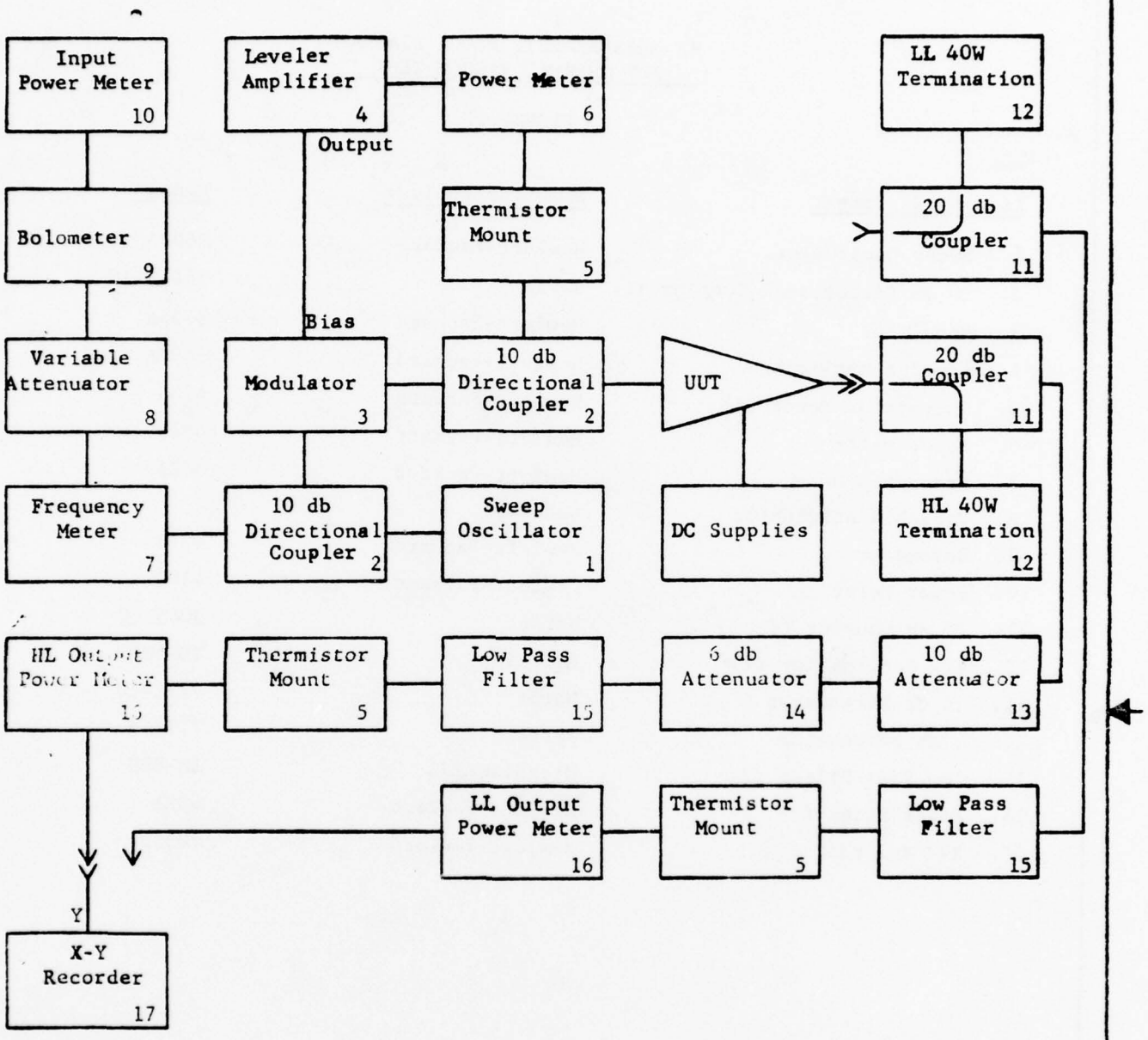
FOR VIBRATION TEST

FIGURE 16

RF MEASUREMENTS BLOCK DIAGRAM
FOR VIBRATION TEST

FIGURE 16

| List of Equipment | Make (or Equiv.) | Model |
|---|---|---|
| 1. Signal Generator | Polarad | 1207 |
| 2. Frequency Meter | Hewlett-Packard | H532A |
| 3. 10 db Directional Coupler | Narda | 3044B-10 |
| 4. Thermistor Mount (2) | Hewlett-Packard | 478A |
| 5. Power Meter (2) | Hewlett-Packard | 432A |
| 6. 6 db Attenuator | Narda | 777C |
| 7. 20 db Directional Coupler | Narda | 22580 |
| 8. Load | Narda | 376NM |
| 9. 10 db Attenuator | Narda | 777C |
| 10. Low Pass Filter | Narda | LA-80N |
| 11. 3 db Attenuator | Narda | 7776 |
| 12. DC Power Supply | Lamda | LK343A |
| 13. Digital Voltmeter | Fairchild | 7000-OPT-1 |




RF MEASUREMENTS BLOCK DIAGRAM
FOR THERMAL VACUUM TEST

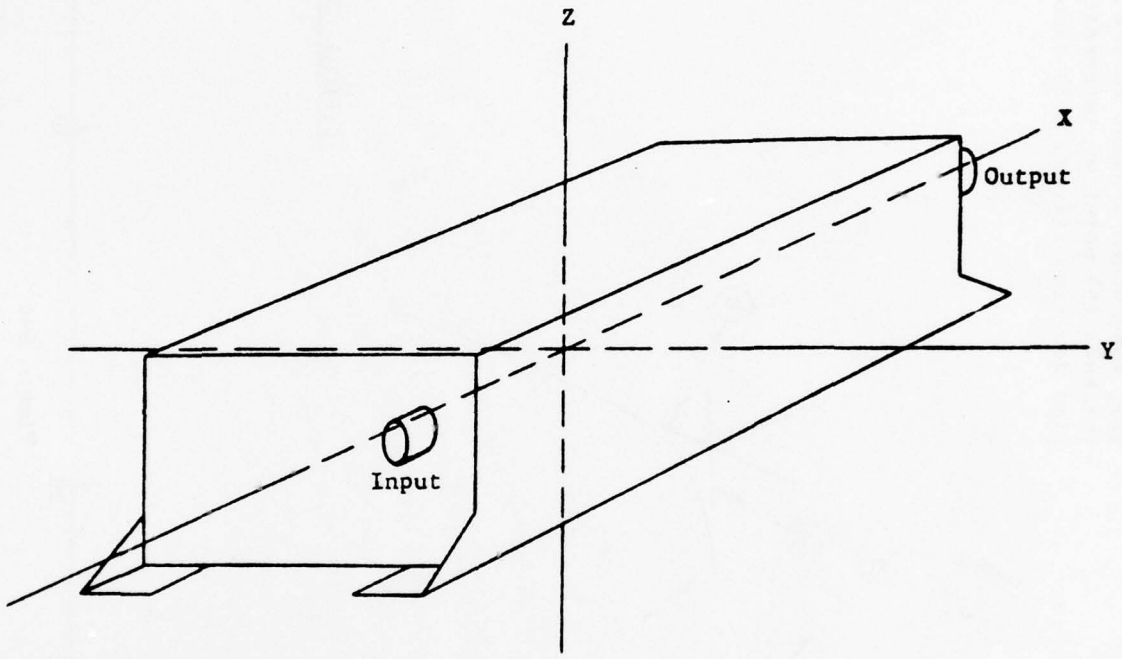
FIGURE 17

RF MEASUREMENTS BLOCK DIAGRAM
FOR THERMAL VACUUM TEST

FIGURE 17

| List of Equipment | Make (or Equiv.) | Model |
|---|---|---|
| 1. Sweep Oscillator | Hewlett-Packard | 8690B |
| 2. 10 db Directional Coupler (2) | Narda | 3044B-10 |
| 3. Modulator | Hewlett-Packard | 8734A |
| 4. Leveler Amplifier | Hewlett-Packard | 8401A |
| 5. Thermistor Mount (3) | Hewlett-Packard | 478A |
| 6. Power Meter | Hewlett-Packard | 431B |
| 7. Frequency Meter | Hewlett-Packard | 532A |
| 8. Variable Attenuator | Sanders | 1 |
| 9. Bolometer | Hewlett-Packard | 477B |
| 10. Power Meter | Hewlett-Packard | 430C |
| 11. 20 db Coupler (2) | Narda | 3045-20 |
| 12. 40W Termination (2) | Microlab | TD-5NM |
| 13. 10 db Attenuator | Narda | 777C-10 |
| 14. 6 db Attenuator | Narda | 777C-6 |
| 15. Low Pass Filter (2) | Microlab/FXR | LA-80N |
| 16. Power Meter (2) | Hewlett-Packard | 432A |
| 17. X-Y Recorder | Hewlett-Packard | 7035B |

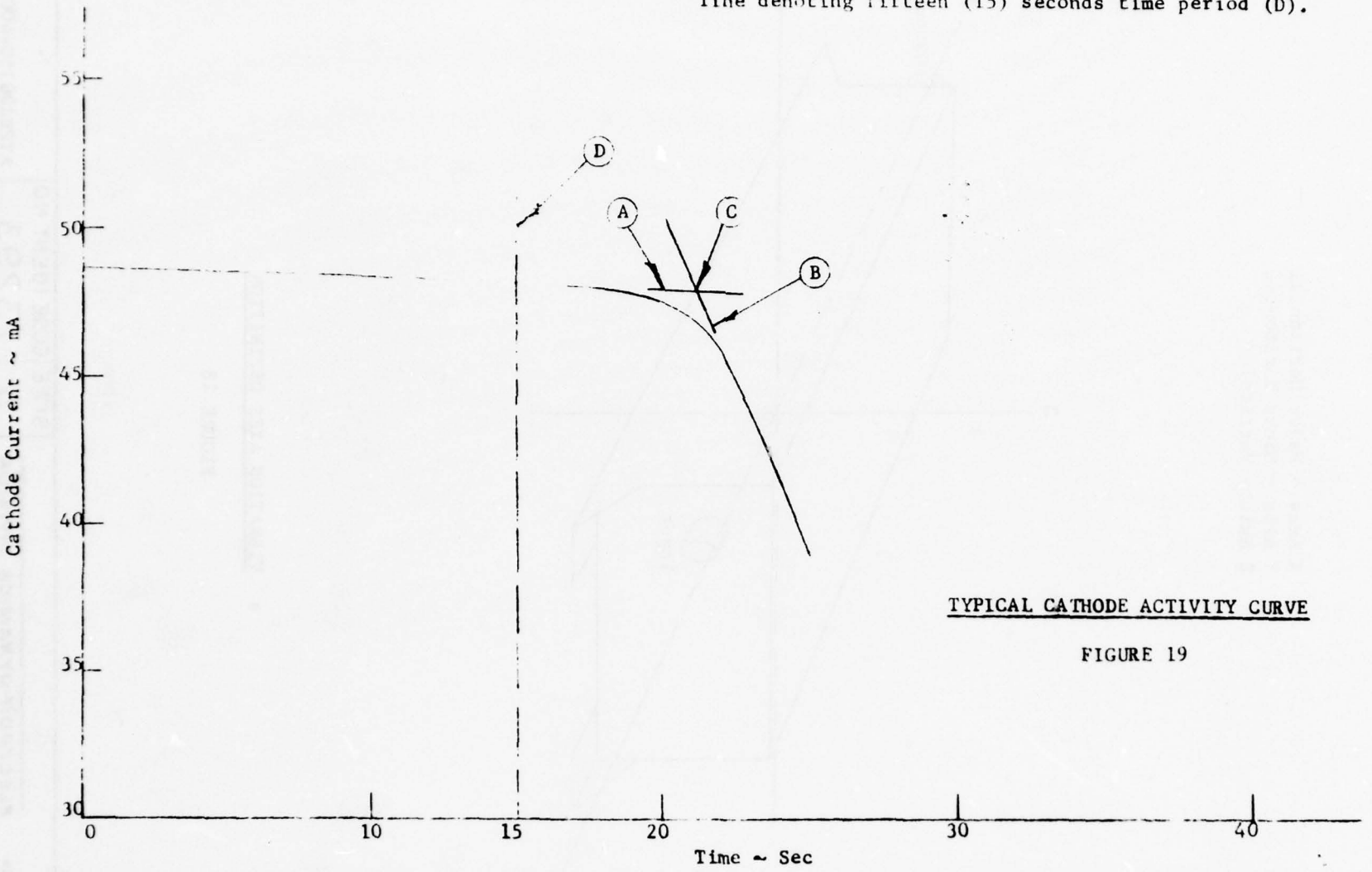
X Axis = Major Horizontal
Y Axis = Minor Horizontal
Z Axis = Vertical




VIBRATION AXES DEFINITION

FIGURE 18

Typical cathode activity curve showing line drawn tangent to the slope of the portion prior to the knee (A), line drawn tangent to the slope of the portion after the knee (B) point of intersection of tangents (C), and line denoting fifteen (15) seconds time period (D).




TYPICAL CATHODE ACTIVITY CURVE

FIGURE 19

# APPENDIX D
# 777 MODEL 1202H HIGH LEVEL TWTA
# LIFE TEST REDUCED DATA

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | HDB200350-400 | ACCEPTANCE TEST DATA |

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | PRE FINAL 4/1/71 | FINAL 4/5/71 | 6,600 2/1/72 | 13,200 11/28/72 | 20,000 9/18/73 | 27,473 8/13/74 | 54,334 11/1/77 | / / | / / | / / | / / | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.893 | 1.892 | 1.917 | 1.913 | 1.905 | 1.912 | 1.90 | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.829 | 3.831 | 3.830 | 3.829 | 3.840 | 3.834 | 3.85 | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.380 | 4.383 | 4.064 | 4.056 | 4.054 | 4.040 | 4.04 | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.537 | 0.560 | 0.629 | 0.639 | 0.709 | 0.757 | 0.609 | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.673 | 2.654 | 2.546 | 2.600 | 2.652 | 2.707 | 2.710 | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.3 | 43.32 | 43.12 | 43.60 | 43.13 | 43.15 | 43.10 | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.83 | 53.73 | 53.70 | 54.00 | 54.05# | 54.10 | 54.30 | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 15.0 | 14.5# | 13.6# | 13.3# | 13.3# | 11.4 | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | 1. | 1. | 1. | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. # DOES NOT MEET SPECIFICATION LIMITS

TWT has 3669 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE

SPEC: LTPB 200350-400

SERIAL NO. 12-1



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA ATP '0' | DATA 19969 | DATA 54334 | HOUR |
|---|---|---|---|---|---|---|---|
| 4.1 | CATHODE ACTIVITY, SECONDS | 15.0 | | 15.0 | 13.3 | 11.4 | |
| 4.2 | STABILITY | | | ✓ | ✓ | ✓ | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | ✓ | |
| 4.4 | INRUSH CURRENT | | | | | | |
| a) | INTEGRAL >Iss, t=5msec, ma-sec | | 30 | 6.1 | 9.5 | 12.0 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 1.70 | 1.8 | 1.4 | |
| c) | I >Iss PRIOR TO H.V., AMPS | | 15 | 5.0 | 3.0 | 3.8 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 10.0 | 11.0 | 11.0 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, sec | 60 | 120 | 96 | 85 | 91 | |
| f) | I>Iss, t=5msec AFTER H.V., AMPS | | .75 | .50 | .50 | 0 | |
| g) | I WITHIN ±3% Iss +>100msec | | | ✓ | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, VSWR | | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 1.94 | 1.82 | 1.61 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.25 | 1.28 | 1.13 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.13 | 1.15 | 1.04 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.13 | 1.15 | 1.13 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | | |
| | 1) INPUT CURRENT TLM V | | | 1.892 | 1.905 | 1.90 | |
| | 2) CATHODE CURRENT TLM V | | | 3.831 | 3.840 | 3.85 | |
| | 3) HEATER VOLTAGE TLM V | | | 4.383 | 4.054 | 4.04 | |
| | 4) HELIX CURRENT TLM V | | | .560 | .709 | .609 | |
| | 5) CATHODE VOLTAGE TLM V | | | 2.654 | 2.652 | 2.71 | |
| b) | $P_o$ (SAT.), dBm | 43 | | 43.32 | 43.13 | 43.1 | |
| c) | G (SAT.), dB | 45 | 48 | 46.3 | 46.90 | 47.5 | |

S/N _____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 19969 | DATA 54334 | DATA HC |
|---|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.32 | 43.13 | 43.1 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.30 | 46.90 | 47.5 | |
| | 3) I in , AMPS | | | 4.143 | 4.177 | 4.20 | |
| | 4) Pin (DC), WATTS | | 103 | 95.289 | 96.09 | 96.6 | |
| b) | Vin = 33 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.32 | 43.13 | 43.1 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.30 | 46.90 | 47.5 | |
| | 3) I in , AMPS | | | 2.914 | 2.937 | 2.93 | |
| | 4) Pin (DC), WATTS | | 103 | 96.162 | 96.921 | 96.7 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.15 | ±0.15 | ±0.18 | |
| 4.9 | GAIN FLATNESS | | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | ✓ | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | | |
| a) | Gss , dB | 49 | 54 | 53.73 | 54.05 | 54.3 | |
| b) | G (Var), dB | | ±0.35 | ±0.10 | ±0.15 | ±0.2 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 53.73 | 54.05 | 54.3 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.10 | ±0.15 | ±0.2 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 53.73 | 54.05 | 54.3 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.10 | ±0.15 | ±0.2 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.006 | 0.008 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.004 | 0.009 | 0.007 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.006 | 0.008 | 0.003 | |
| b) | Vin = 28 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.006 | 0.008 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.004 | 0.009 | 0.007 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.006 | 0.008 | 0.003 | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.006 | 0.008 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.004 | 0.009 | 0.007 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.006 | 0.008 | 0.003 | |
| 4.12 | NOISE FIGURE | | | | | | |
| a) | N.F., dB | | 33 | 28.0 | 28.0 | 26. | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 19969 | 54334 | HOUR |
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.25 | 10.30 | 9.4 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 22.4 | 21.0 | 21.8 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 28.5 | 27.6 | 29.6 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 27/30 | 25/30 | 28.5/30 | |
| 4.15 | AM/PM CONVERSION | | | | | | |
| | $\frac{\Delta\phi}{\Delta Pi(rl)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.2 | 1.4 | 1.5 | |
| b) | at 0dB | | 3.5 | 1.3 | 1.4 | 1.6 | |
| c) | at -2dB | | 3.5 | 1.5 | 1.6 | 1.9 | |
| d) | at -3dB | | 3.5 | 1.7 | 1.8 | 1.9 | |
| e) | at -4dB | | 3.5 | 1.9 | 1.9 | 2.0 | |
| f) | at -5dB | | 3.5 | 2.0 | 2.0 | 2.0 | |
| g) | at -6dB | | 3.5 | 1.9 | 2.1 | 2.1 | |
| h) | at -7dB | | 3.5 | 1.8 | 2.0 | 2.0 | |
| i) | at -8dB | | 3.5 | 1.6 | 1.7 | 1.8 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHz LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.01 | .0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | ✓ | ✓ | ✓ | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | | | | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 13.6 | 13.0 | 11.55 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 / B200350-123 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LIPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 257 | 725 | 1057 | 1458 | 1654 | 1874 | 2112 | 2376 | 2389 | 2528 | 2717 | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/3/71 | week of 5/31/71 | week of 6/7/71 | week of 6/24/71 | week of 7/1/71 | week of 7/14/71 | week of 7/21/71 | week of 7/31/71 | week of 8/1/71 | week of 8/11/71 | week of 8/19/71 | week of 8/26/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.900 | 1.989 | 1.892 | 1.869 | 1.910 | 1.904 | 1.900 | 1.940 | [illegible] | 1.909 | 1.917 | 1.893 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.828 | 3.836 | 3.831 | 3.830 | 3.831 | 3.834 | 3.829 | 3.836 | [illegible] | 3.837 | 3.836 | 3.834 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.056 | 4.071 | 4.043 | 4.070 | 4.049 | 4.059 | 4.051 | 4.058 | 4.056 | 4.061 | 4.063 | [illegible] |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .577 | .601 | .577 | .607 | .610 | .587 | .580 | .610 | .570 | .607 | .612 | .606 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.660 | 2.661 | 2.750 | 2.523 | 2.591 | 2.604 | 2.647 | 2.624 | 2.625 | 2.578 | 2.551 | 2.6[illegible] |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.45 | 43.50 | 43.40 | 43.40 | 43.40 | 43.40 | 43.45 | [illegible] | 43.40 | 43.35 | 43.40 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.58 | 53.40 | 53.38 | 53.48 | 53.50 | 53.43 | 53.51 | [illegible].30 | [illegible] | 53.50 | 53.53 | 53.43 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_R$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | 7/21/71 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-xCO

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 2881 week of 9/7/71 | 3214 week of 9/10/71 | 3357 week of 9/16/71 | 3525 week of 9/23/71 | 3716 week of 10/1/71 | 3846 week of 10/7/71 | 4019 week of 10/14/71 | 4181 week of 10/21/71 | 4329 week of 10/27/71 | 4516 week of 11/4/71 | 4685 week of 11/11/71 | 4876 week of 11/19/71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.914 | 1.899 | 1.903 | 1.931 | 1.902 | 1.911 | 1.899 | 1.901 | 1.909 | 1.901 | 1.892 | 1.900 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.828 | 3.834 | 3.834 | 3.835 | 3.834 | 3.835 | 3.833 | 3.833 | 3.837 | 3.831 | 3.830 | 3.830 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.034 | 4.055 | 4.052 | 4.064 | 4.057 | 4.060 | 4.057 | 4.055 | 4.062 | 4.059 | 4.047 | 4.051 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .570 | .590 | .609 | .619 | .606 | .610 | .615 | .613 | .616 | .640 | .599 | .600 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.813 | 2.640 | 2.674 | 2.543 | 2.616 | 2.600 | 2.625 | 2.636 | 2.596 | 2.619 | 2.714 | 2.600 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.55 | 43.35 | 43.45 | 43.30 | 43.30 | 43.35 | 43.35 | 43.40 | 43.40 | 43.40 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.11 | 53.33 | 53.28 | 53.30 | 53.50 | 53.50 | 53.40 | 53.45 | 53.40 | 53.40 | 53.40 | 53.30 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 11/2/71 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. _____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT) FREQ. $f_o$

TOTAL ACCUMULATED HOURS

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | 4996 | 5162 | 5373 | 5522 | 5610 | 5803 | 5971 | 6132 | 6328 | 6471 | 6654 | 6791 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 11/24/71 | week of 12/1/71 | week of 12/10/71 | week of 12/16/71 | week of 12/22/71 | week of 12/30/71 | week of 1/6/72 | week of 1/13/72 | week of 1/22/72 | week of 1/27/72 | week of 2/4/72 | week of 2/10/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.901 | 1.899 | 1.90 | 1.892 | 1.868 | 1.841 | 1.888 | 1.897 | 1.87 | 1.90 | 1.89 | 1.89 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.833 | 3.829 | 3.831 | 3.833 | 3.830 | 3.835 | 3.831 | 3.836 | 3.84 | 3.84 | 3.84 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.058 | 4.054 | 4.057 | 4.052 | 4.051 | 4.050 | 4.055 | 4.057 | 4.05 | 4.06 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .616 | .604 | .630 | .609 | .600 | .580 | .588 | .623 | .61 | .59 | .59 | .61 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.611 | 2.647 | 2.631 | 2.679 | 2.650 | 2.633 | 2.639 | 2.627 | 2.63 | 2.59 | 2.61 | 2.60 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.30 | 43.40 | 43.45 | 43.40 | 43.45 | 43.45 | 43.40 | 43.35 | 43.45 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.30 | 53.40 | 53.40 | 53.60 | 53.50 | 53.50 | 53.50 | 53.60 | 53.50 | 53.40 | 53.30 | 53.70 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 1/26/72 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-155 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 6966 | 7110 | 7257 | 7407 | 7600 | 7719 | 7903 | 8026 | 8264 | 8409 | 8605 | 8766 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 2/17/72 | week of 2/24/72 | week of 3/3/72 | week of 3/9/72 | week of 3/17/72 | week of 3/22/72 | week of 3/30/72 | week of 4/7/72 | week of 4/21/72 | week of 4/27/72 | week of 5/5/72 | week of 5/12/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.90 | 1.90 | 1.90 | 1.92 | 1.90 | 1.89 | 1.90 | 1.90 | 1.89 | 1.90 | 1.90 | 1.90 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.83 | 3.83 | 3.85 | 3.84 | 3.83 | 3.83 | 3.82 | 3.82 | 3.83 | 3.83 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.05 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 | 4.05 | 4.05 | 4.06 | 4.05 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .60 | .61 | .61 | .62 | .60 | .61 | .60 | .57 | .60 | .61 | .56 | .60 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.60 | 2.66 | 2.61 | 2.56 | 2.61 | 2.64 | 2.61 | 2.64 | 2.64 | 2.57 | 2.64 | 2.64 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.40 | 43.40 | 43.35 | 43.35 | 43.35 | 43.35 | 43.35 | 43.35 | 43.40 | 43.40 | 43.45 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.70 | 53.50 | 53.50 | 53.70 | 53.60 | 53.70 | 53.60 | 53.55 | 53.50 | 53.70 | 53.70 | 53.80 |
| $i_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 4/19/72 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] LOS ANGELES, CALIFORNIA

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 8911 week of 5/18/72 | 9102 week of 5/26/72 | 9269 week of 6/2/72 | 9442 week of 6/9/72 | 9603 week of 6/16/72 | 9775 week of 6/23/72 | 9943 week of 6/30/72 | 10111 week of 7/7/72 | 10272 week of 7/14/72 | 10438 week of 7/21/72 | 10600 week of 7/28/72 | 10762 week of 8/4/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.90 | 1.89 | 1.91 | 1.89 | 1.91 | 1.89 | 1.90 | 1.89 | 1.90 | 1.93 | 1.89 | 1.87 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.82 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.04 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 | 4.06 | 4.06 | 4.06 | 4.04 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .51 | .601 | .60 | .61 | .61 | .60 | .62 | .61 | .61 | .64 | .61 | .61 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.64 | 2.75 | 2.59 | 2.67 | 2.60 | 2.69 | 2.67 | 2.66 | 2.67 | 2.52 | 2.74 | 2.58 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.45 | 43.50 | 43.50 | 43.45 | 43.45 | 43.45 | 43.45 | 43.45 | 43.40 | 43.50 | 43.45 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | 53.90 | 54.00 | 53.80 | 53.90 | 54.00 | 53.90 | 54.00 | 53.90 | 53.90 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 10932 | 11094 | 11236 | 11308 | 11385 | 11548 | 11714 | 11883 | 12045 | 12210 | 12374 | 12549 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 8/11/72 | week of 8/18/72 | week of 8/28/72 | week of 8/31/72 | week of 9/8/72 | week of 9/15/72 | week of 9/22/72 | week of 9/29/72 | week of 10/6/72 | week of 10/13/72 | week of 10/20/72 | week of 10/27/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.92 | 1.89 | 1.90 | 1.88 | 1.90 | 1.90 | 1.90 | 1.91 | 1.90 | 1.88 | 1.90 | 1.88 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.82 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.05 | 4.06 | 4.04 | 4.05 | 4.06 | 4.06 | .06 | 4.05 | 4.04 | 4.05 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .61 | .60 | .61 | .60 | .62 | .63 | .61 | .635 | .631 | .62 | .63 | .62 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.54 | 2.66 | 2.63 | 2.67 | 2.62 | 2.62 | 2.62 | 2.59 | 2.65 | 2.65 | 2.64 | 2.63 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.40 | 43.45 | 43.45 | 43.50 | 43.45 | 43.45 | 43.45 | 43.40 | 43.40 | 43.50 | 43.40 | 43.40 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 53.80 | 53.90 | 54.00 | 54.00 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | | 87.00 | | | 88.00 | | | 88.80 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | 14.62 | | | 14.62 | | | 14.63 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | 14.76 | | | 14.78 | | | 14.80 | | |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | 9/7/72 | | | 9/29/72 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_i$ (SAT) FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 12710 week of 11/3/72 | 12852 week of 11/10/72 | 13019 week of 11/17/72 | 13133 week of 11/22/72 | 13330 week of 12/1/72 | 13502 week of 12/8/72 | 13663 week of 12/15/72 | 13799 week of 12/21/72 | 13874 week of 12/29/72 | 14040 week of 1/5/73 | 14206 week of 1/12/73 | 14369 week of 1/19/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.91 | 1.91 | 1.90 | 1.91 | 1.93 | 1.91 | 1.91 | 1.91 | 1.91 | 1.91 | 1.90 | 1.91 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.83 | 3.84 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.06 | 4.05 | 4.05 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .63 | .63 | .64 | .61 | .66 | .63 | .61 | .65 | .64 | .63 | .65 | .65 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.64 | 2.58 | 2.65 | 2.67 | 2.52 | 2.56 | 2.54 | 2.63 | 2.61 | 2.57 | 2.68 | 2.63 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.35 | 43.45 | 43.40 | 43.40 | 43.45 | 43.45 | 43.45 | 43.40 | 43.45 | 43.45 | 43.40 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 53.80 | 54.00 | 54.00 | 53.80 | 53.90 | 53.90 | 53.70 | 53.80 | 53.80 | 53.70 | 53.90 |
| $I_L$ INSERTION LOSS | | | db | 94.0 | | | 91.0 | | | 91.5 | | | 90.0 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 14.63 | | | 14.80 | | | 14.68 | | | 14.66 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 14.80 | | | 14.82 | | | 14.82 | | | 14.83 | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | 13.6# | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | 1/12/73 | |
| SIGNIFICANT EVENT NOTES | | | | | | | 1. | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1 #DOES NOT MEET MIN. EMISSION LIMIT

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-131 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 14607 week of 1/29/73 | 14690 week of 2/2/73 | 14859 week of 2/9/73 | 15028 week of 2/16/73 | 15189 week of 2/23/73 | 15363 week of 3/2/73 | 15525 week of 3/9/73 | 15698 week of 3/16/73 | 15858 week of 3/23/73 | 16023 week of 3/30/73 | 16190 week of 4/6/73 | 16357 week of 4/13/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.91 | 1.90 | 1.90 | 1.90 | 1.90 | 1.91 | 1.91 | 1.90 | 1.91 | 1.91 | 1.91 | 1.91 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.83 | 3.83 | 3.83 | 3.83 | 3.84 | 3.84 | 3.83 | 3.84 | 3.84 | 3.84 | 3.81 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.04 | 4.05 | 4.06 | 4.05 | 4.05 | 4.03 | 4.[illegible] | 4.06 | 4.05 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .63 | .63 | .66 | .63 | .65 | .66 | .66 | .66 | .67 | .67 | .66 | .67 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.63 | 2.67 | 2.65 | 2.61 | 2.70 | 2.66 | 2.66 | 2.66 | 2.63 | 2.66 | 2.66 | 2.62 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.30 | 43.30 | 43.30 | 43.30 | 43.35 | 43.30 | 43.40 | 43.35 | 43.35 | 43.35 | |
| $G_{SS}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.90 | 53.90 | 53.90 | 53.80 | 53.70 | 53.70 | 53.80 | 53.80 | 53.90 | 53.90 | 53.80 | |
| $L_I$ INSERTION LOSS | | | db | 92.00 | | | 92.80 | | | | | | 92.00 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 14.69 | | | 14.70 | | | | | | 14.72 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 14.86 | | | 14.86 | | | | | | 14.88 | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | 4/4/73 | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO. LTPB200350-[illegible]

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 16524 | | | | 17174 | 17334 | 17508 | 17672 | 17822 | 17984 | 18123 | 18290 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 4/20/73 | week of 4/27/73 | week of 5/4/73 | week of 5/11/73 | week of 5/18/73 | week of 5/25/73 | week of 6/1/73 | week of 6/9/73 | week of 6/15/73 | week of 6/22/73 | week of 6/29/73 | week of 7/6/73 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.91 | | | | 1.90 | 1.91 | 1.91 | 1.93 | 1.91 | 1.91 | 1.91 | 1.90 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | | | | 3.84 | 3.84 | 3.85 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | | | | 4.05 | 4.06 | 4.05 | 4.06 | 4.05 | 4.06 | 4.05 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .67 | | | | .659 | .67 | .67 | .69 | .68 | .68 | .68 | .66 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.64 | | | | 2.64 | 2.63 | 2.65 | 2.63 | 2.66 | 2.63 | 2.68 | 2.76 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | | | | 43.40 | 43.50 | 43.45 | 43.50 | 43.45 | 43.45 | 43.40 | 43.40 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | | | | 54.10* | 54.10* | 54.20* | 54.10* | 54.20* | 54.10* | 54.20* | 54.20* |
| $I_L$ INSERTION LOSS | | | db | | | | 92.00 | | | | | | 90.00 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | 14.76 | | | | | | 14.75 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | 14.92 | | | | | | 14.92 | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | 1 | 1. | 1 | 1 | 1 | 1 | 1 | 1. |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 * DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 18457 | 18769 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 7/13/73 | week of 7/26/73 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.91 | 1.93 | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.84 | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.07 | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .68 | .69 | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.63 | 2.52 | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.30 | | | | | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10* | 54.10* | | | | | | | | | | |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AM}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AG}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1 | 1 | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. * DOES NOT MEET SPECIFICATION LIMIT

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: [illegible] LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE $P_o$(SAT) FREQ $f_o$

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 19,455 | 20,190 | 20,881 | 21,551 | 22,174 | 22,970 | 23,596 | 24,355 | 24,963 | 25,688 | 26,372 | 27,042 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/73 | 9/28/73 | 10/26/73 | 11/30/73 | 12/28/73 | 2/1/74 | 2/28/74 | 4/1/74 | 4/29/74 | 5/28/74 | 6/[illegible]/74 | 7/[illegible]/74 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.93 | 1.90 | 1.90 | 1.90 | 1.90 | 1.91 | 1.91 | 1.92 | 1.92 | 1.90 | 1.91 | 1.92 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.84 | 3.83 | 3.82 | 3.83 | 3.83 | 3.83 | 3.83 | 3.84 | 3.83 | 3.84 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.05 | 4.05 | 4.04 | 4.04 | 4.04 | 4.05 | 4.05 | 4.04 | 4.03 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .68 | .69 | .69 | .69 | .71 | .71 | .73 | .79 | .81 | .71 | .73 | .73 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.67 | 2.69 | 2.58 | 2.68 | 2.66 | 2.66 | 2.65 | 2.61 | 2.69 | 2.76 | 2.69 | 2.66 |
| $P_o$ (SAT) FREQ $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.40 | 43.40 | 43.35 | 43.40 | 43.50 | 43.50 | 43.50 | 43.30 | 43.40 | 43.40 | 43.4 |
| $G_{SS}$ FREQ $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.2# | 54.1# | 54.2# | 54.2# | 54.3# | 54.4# | 54.3# | 54.2# | 54.3# | 54.2# | 54.2# | 54.1# |
| $I_L$ INSERTION LOSS | | | db | 89.5 | 89.3 | 92.5 | 93.0 | 89.0 | 89.00 | 89.00 | 93.0 | 92.0 | 92.0 | 93.0 | 92.0 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 14.8 | 14.81 | 14.75 | 14.79 | 14.83 | 14.79 | 14.86 | 14.9 | 14.88 | 14.87 | 14.85 | 14.92 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 14.97 | 14.98 | 14.89 | 14.97 | 14.99 | 14.99 | 15.01 | 15.07 | 15.05 | 15.05 | 15.04 | 15.08 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 13.2# | 13.3# | * | | 13.2# | 12.8# | 13.6# | 13.2# | 14.5# | 13.1# | 13.0# | 12.9# |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8.10/73 | 8/10/73 | 8/10/73 | 8/10/73 | 11/28/73 | 11/28/73 | 11/28/73 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

*RECORDER OUT FOR REPAIR.

DOES NOT MEET SPECIFICATION LIMITS

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS / NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS | 27,833 | 28,534 | 29,305 | 30,017 | 30,613 | 31,400 | 32001 | 32,699 | 33,466 | 34,225 | 34,875 | 35,607 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 8/30/14 | 9 BD14 | 11/1/14 | 12/2/14 | 12 27/14 | 1/29/15 | 2/26/15 | 3/28/15 | 4-29-5 4/28/15 | 5/31/15 | 7/1/75 | 8 12 15 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 1.918 | 1.91 | 1.92 | 1.92 | 1.90 | 1.93 | 1.90 | 1.92 | 1.90 | 1.91 | 1.91 | 1.90 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.840 | 3.840 | 3.85 | 3.84 | 3.83 | 3.84 | 3.83 | 3.84 | 3.83 | 3.83 | 3.84 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.047 | 4.042 | 4.04 | 4.04 | 4.03 | 4.04 | 4.03 | 4.04 | 4.03 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .756 | .752 | .782 | .747 | .731 | .76 | .83 | .77 | .72 | .73 | .72 | .76 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.642 | 2.661 | 2.593 | 2.67 | 2.75 | 2.63 | 2.73 | 2.62 | 2.73 | 2.70 | 2.69 | 2.72 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.3 | 43.4 | 43.35 | 43.35 | 43.4 | 43.35 | 43.40 | 43.25 | 43.3 | 43.45 | 43.40 | 43.40 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 54.0 | 54.1* | 54.0 | 54.3* | 54.0 | 54.4* | 54.10* | 54.2* | 54.2* | 54.20* | 54.10* | 54.2* |
| $I_L$ INSERTION LOSS | | | db | | 92.1 | 92.5 | 85.2 | 83.5 | 83.6 | 85.1 | 83.5 | 86.0 | 90.0 | 86.0 | 85.0 | 86.0 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 14.93 | 14.94 | 14.93 | 14.96 | 14.96 | 14.91 | 14.96 | 14.96 | 14.95 | 14.96 | 14.99 | 14.99 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 15.09 | 15.11 | 15.10 | 15.13 | 15.15 | 15.08 | 15.13 | 15.14 | 15.18 | 15.15 | 15.16 | 15.17 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 13.1* | 13.1* | 13.4* | 13.0* | 12.8* | 13.7* | 12.5* | 14.0* | 12.9* | 13.1* | 12.3* | 13.2* |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-24-4 | 7-24-4 | 7-24-4 | 11-21-4 | 11-21-4 | 11-21-4 | 1-31-5 | 1-31-5 | 1-31-5 | 4-1-5 | 4-1-5 | 7-30-5 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N |

SIGNIFICANT EVENT NOTES
* OUT OF SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

45,000

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ | TOTAL ACCUMULATED HOURS | | | 36,373 | 37,119 | 37,764 | 38,553 | 39,490 | 39993 | 40,660 | 41,468 | 42012 | 42,830 | 43,570 | ~~918~~ 45,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 9 12 15 | 10 14 15 | 11 11 15 | 12 13 15 | 1 11 16 | 2 13 16 | 3 12 16 | 4 15 16 | 4 12 86 | 6 11 16 | 6 13 16 | 9 18 16 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.90 | 1.93 | 1.93 | 1.93 | 1.92 | 1.92 | 1.92 | 1.92 | 1.92 | 1.92 | 1.91 | 1.90 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.87 | 3.84 | 3.84 | 3.83 | 3.84 | 3.84 | 3.85 | 3.85 | 3.83 | 3.85 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.04 | 4.05 | 4.05 | 4.05 | 3.94** | 4.05 | 4.05 | 4.04 | 3.94** | 4.04 | 4.05 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .77 | .77 | .76 | .77 | .75 | .76 | .72 | .75 | .77 | .73 | .758 | .73 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.69 | 2.58 | 2.59 | 2.54 | 2.60 | 2.63 | 2.58 | 2.71 | 2.60 | 2.72 | 2.67 | 2.76 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.40 | 43.35 | 43.30 | 43.3 | 43.35 | 43.35 | 43.30 | 43.30 | 43.40 | 43.40 | 43.40 | 43.50 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.15* | 54.2* | 54.2* | 54.15* | 54.15* | 54.20* | 54.25* | 54.15* | 54.15* | 54.15* | 54.10* | 54.10 |
| $I_L$ INSERTION LOSS | | | db | 90 | 87 | 86 | 91 | 87 | 91 | 86 | 93 | 87 | 86 | 87 | 91 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 14.94 | 14.96 | 15.00 | 15.00 | 15.00 | 15.00 | 15.04 | 14.98 | 14.96 | 14.98 | 14.93 | 14.94 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 15.15 | 15.15 | 15.17 | 15.15 | 15.14 | 15.17 | 15.18 | 15.18 | 15.15 | 15.17 | 15.14 | 15.16 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 12.3* | 12.7* | 13.3* | 13.0* | 12.5* | 12.7* | 12.5* | 13.0* | 12.7* | 12.7* | 12.7* | 11.9 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-30-5 | 7-30-5 | 10-29-5 | 10-29-5 | 10-29-5 | 2-3-6 | 2-3-6 | 2-3-6 | 2-3-6 | 5-7-6 | 5-12-6 | 7-23-6 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | WPN | WPN | WPN | WPN | WPN | WPN | MSK | WPN | MSK | WPN | MSK | |

SIGNIFICANT EVENT NOTES

* Out of specification limit

** INTERMITTENT - CUSTOMER NOTIFIED. Possible problem in TLM circuitry. Problem apparently has cleared up. Unit remained on life test in lieu of further investigation.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS | 45,792 | 46,170 | 46,915 | 47,619 | 48,330 | D.E. 3-0-77 ~~44507~~ 44206 | 49,621 | 50458 | 51,144 | 61646 | ~~52359.5~~ ~~52358~~ | ~~53~~ 52814 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10/13/76 | 10/29/76 | 11/29/76 | 12/29/76 | 2/2/77 | 3/10/77 | 3/28/77 | 5/3/77 | 6/6/17 | 6/28/77 | 7/29/77 | 8/29/77 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 1.91 | 2.140 | 2.140 | 2.139 | ~~2.134~~ 1.923 | 1.873 | 1.908 | 1.914 | 1.906 | 1.93 | 1.910 | 1.925 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.84 | 3.86 | 3.84 | 3.859 | 3.848 | 3.862 | 3.850 | 3.860 | 3.850 | 3.86 | 3.850 | 3.860 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.06 | 4.05 | 4.046 | 4.059 | 4.045 | 4.048 | 4.054 | 4.054 | 4.055 | 4.056 | 4.045 | 4.067 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .73 | .70 | .730 | .782 | .714 | .737 | .727 | .728 | .701 | .723 | .72 | .72 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.60 | 2.68 | 2.73 | 2.640 | 2.631 | 2.721 | 2.629 | 2.641 | 2.620 | 2.61 | 2.710 | 2.699 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.50 | 43.35 | 43.50 | 43.45 | 43.55 | 43.4 | 43.35 | 43.45 | 43.50 | 43.45 | 43.5 | 43.5 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 54.3* | 54.15* | 54.25* | 54.10* | 54.25* | 54.15* | 54.25* | 54.30* | 54.35* | 54.2* | 54.35* | 54.45 |
| $L_L$ INSERTION LOSS | | | db | | 92 | 89 | 90 | 90 | 92 | 90 | 92 | 92 | 88 | 88 | 88 | 93 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 15.0 | 15.01 | 15.0 | 15.0 | 15.0 | 15.14 | 15.12 | 15.10 | 15.10 | 15.14 | 15.13 | 15.13 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 15.16 | 15.16 | 15.18 | 15.18 | 15.23 | 15.28 | 15.30 | 15.28 | 15.30 | 15.31 | 15.30 | 15.34 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 12.1* | 11.7* | 11.8* | 13.0* | 11.7 | 12.2* | 12.0* | 12.2* | 11.7* | 12.8 | 12.2 | 11.5 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-23-76 | 8-31-76 | 10-19-76 | 8-31-76 | 1-19-77 | 1-19-77 | 1-19-77 | 4-25-77 | 4-25-77 | 4-25-77 | 7-27-77 | 7-27-77 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | MSK | MSK | MSK | MSK | MSK | D.R.S | MSK | MSK | MSK | MSK | DRS | MSK |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200~~300~~-400 REV. A
MODEL NO. B200~~300~~-121 SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH/~~LOW~~ LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO. LTPB200~~300~~-400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$ (BAT); FREQ. $f_o$ | LIMITS MIN | LIMITS MAX | UNITS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL ACCUMULATED HOURS | | | | 53,829 | 54334 | | | | | | | | | | | |
| TEST CONDITIONS NOMINAL INPUT VOLTAGE | | | | 9/29/77 | 11/1/17 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.92 | 1.90 | | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.85 | 3.85 | | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.04 | | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.68 | .609 | | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.64 | 2.71 | | | | | | | | | | | |
| $P_o$ (BAT) FREQ. $f_o$ (PARA 4.3.3) | ~~27~~43 | -- | dbm | 43.45 | 43.1 | | | | | | | | | | | |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | ~~35~~49 | 54 ~~39.5~~ | db | 54.4* | 54.3 | | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | 94.3 | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 15.2 | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 15.3 | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 150 ~~60~~ | -- | SEC | 11.7* | 11.4* | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-27-77 | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | | |
| TESTED BY | | | | MSK | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC
1. END OF CONTRACT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

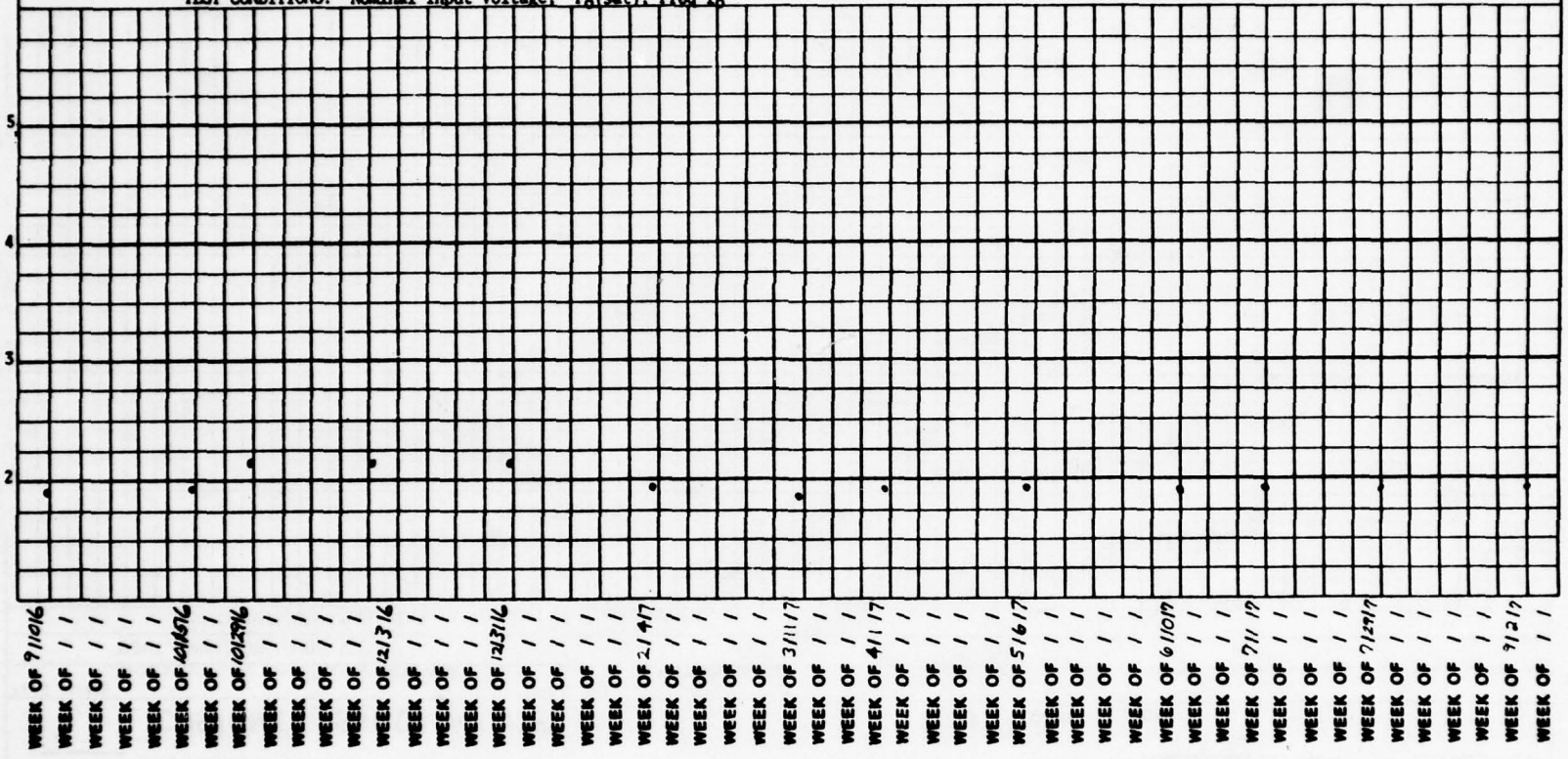
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA

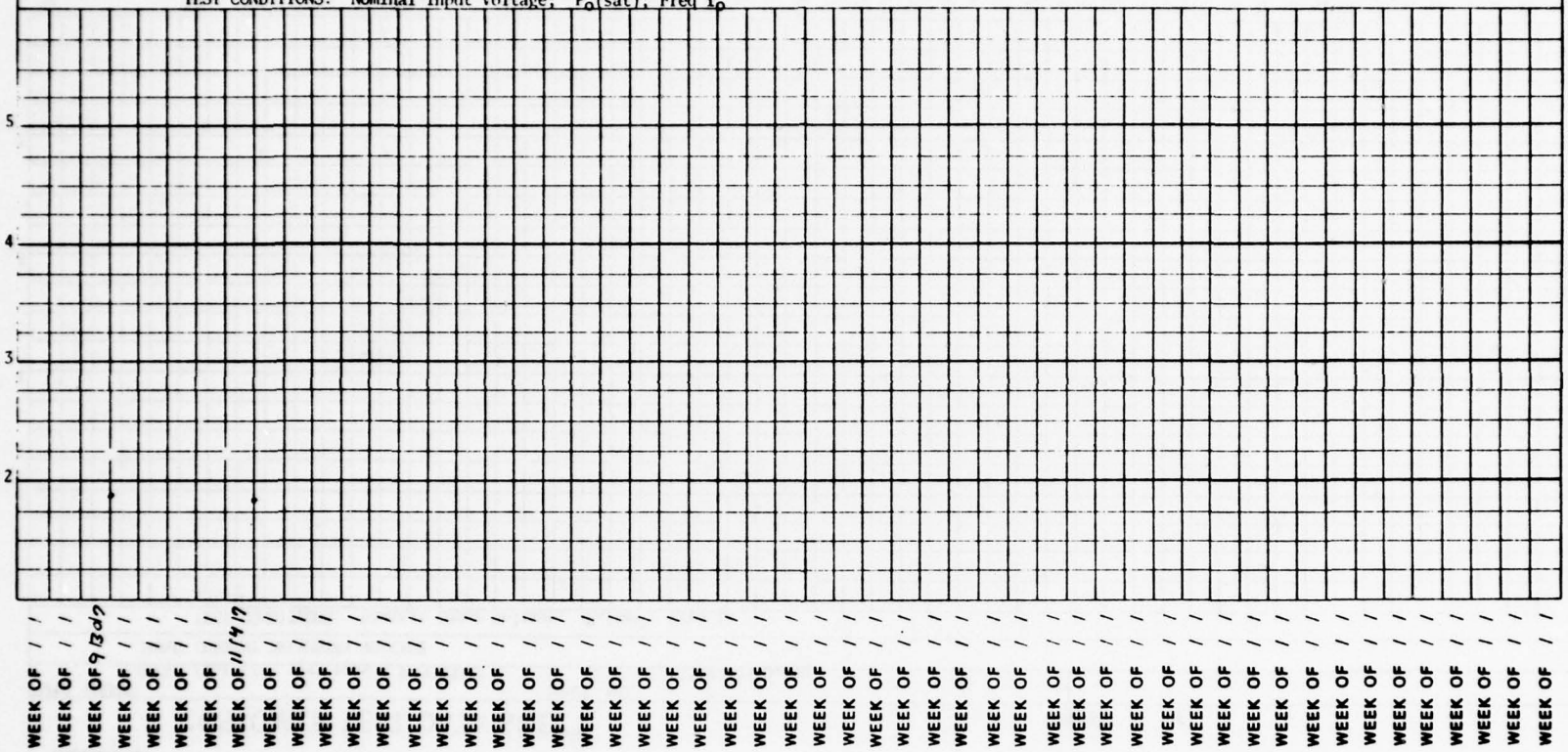
DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE: | LTPB200350-400 |
| INPUT CURRENT TELEMETRY VOLTAGE | |
| TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$ | |

INPUT CURRENT TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ___

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

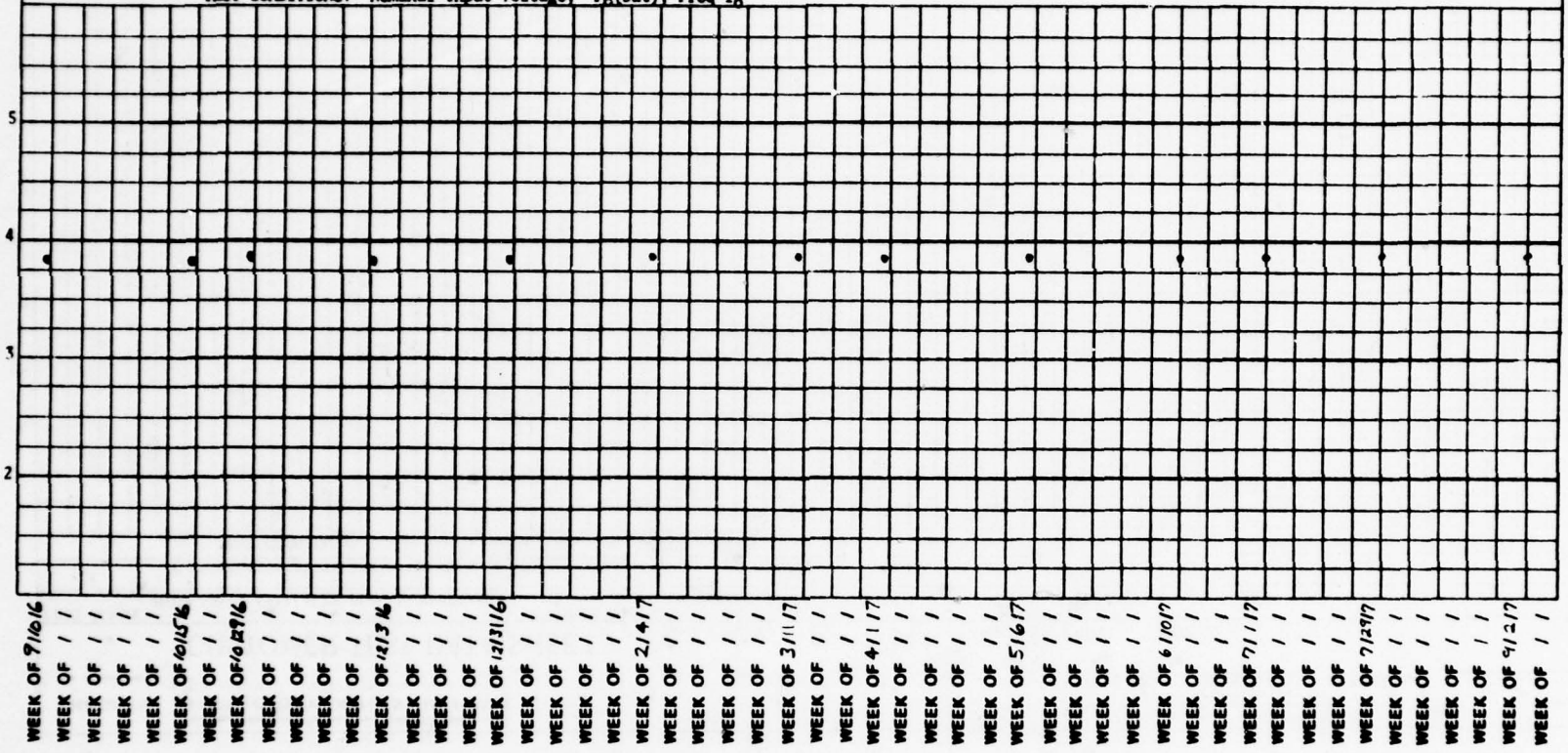
# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ___

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF / /
WEEK OF / /
WEEK OF 9/397
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/497
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

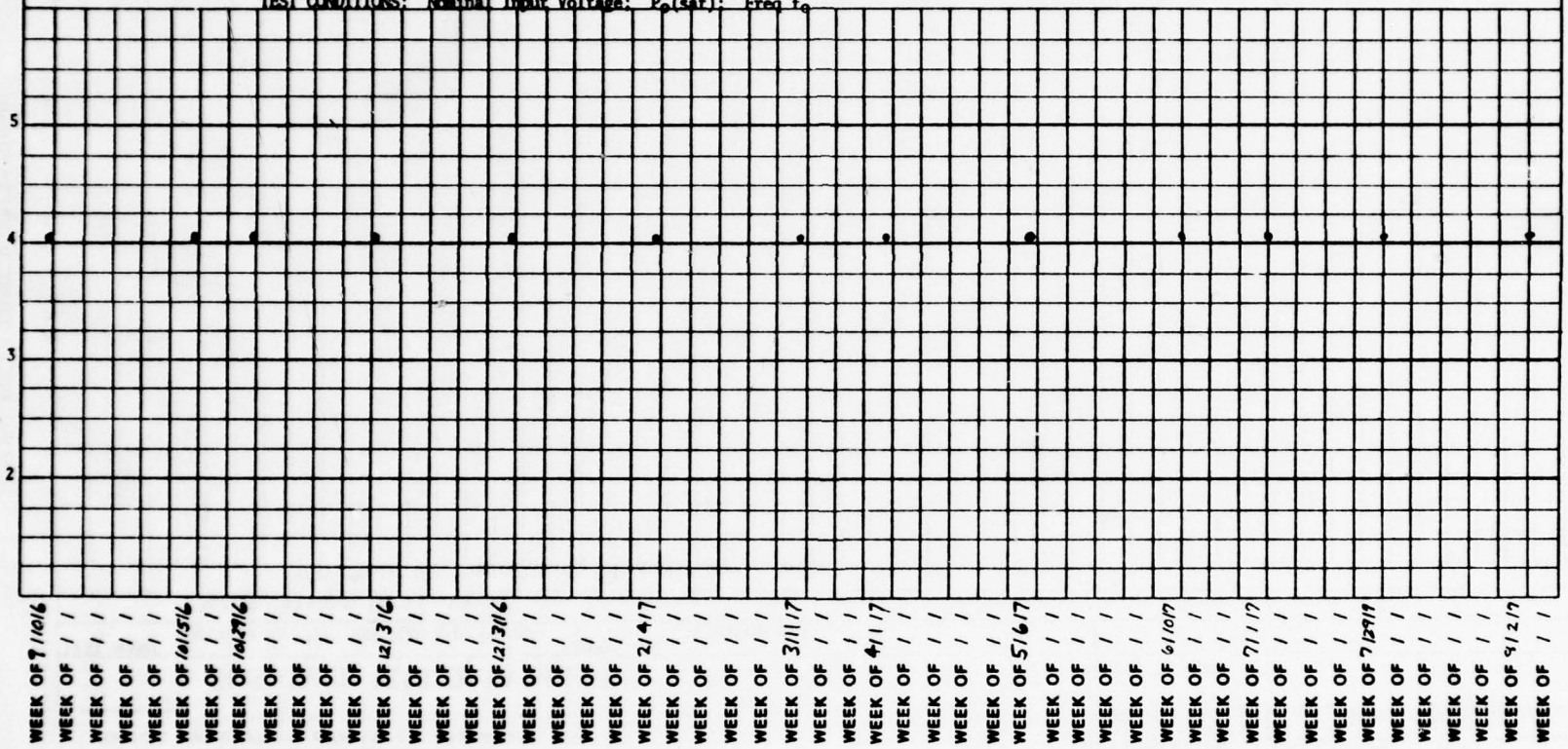
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

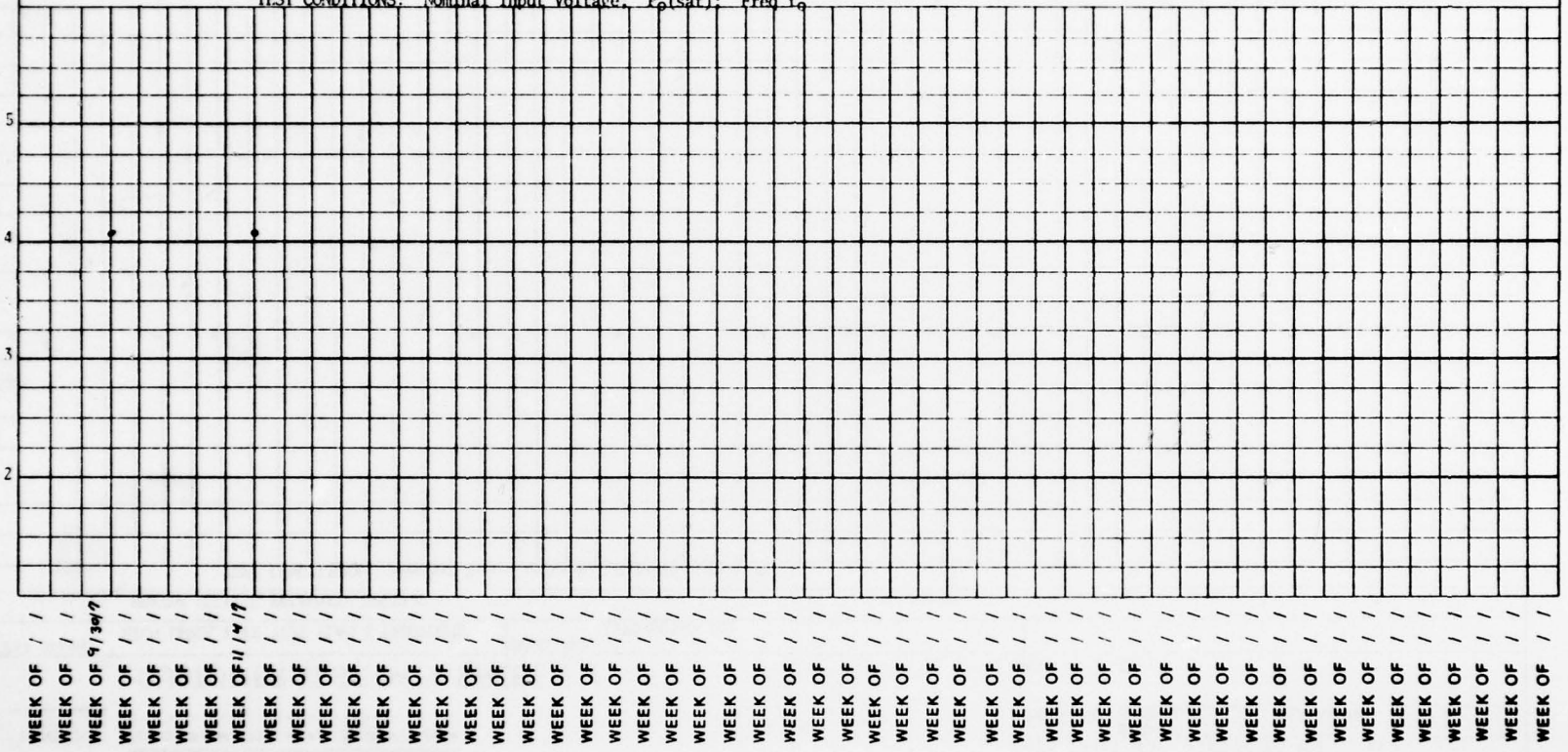
TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. ~~DCB200350-400~~ REV. ____
MODEL NO. ~~B200350-122~~ B200350-121 SERIAL NO. 12-1

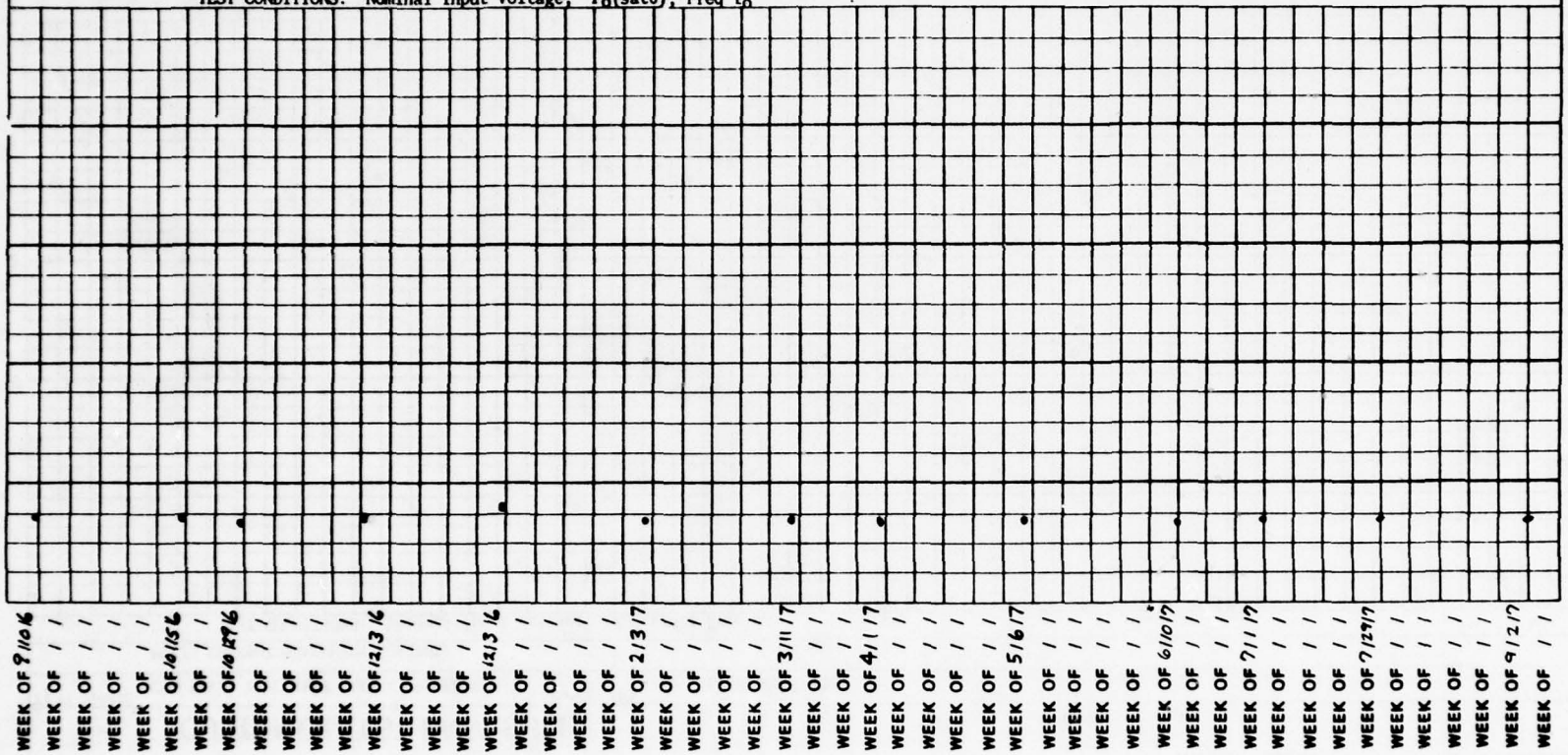
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. ~~DCB200350-400~~ REV. _____

MODEL NO. ~~B200350-121~~ B200350-122 SERIAL NO. 12-1

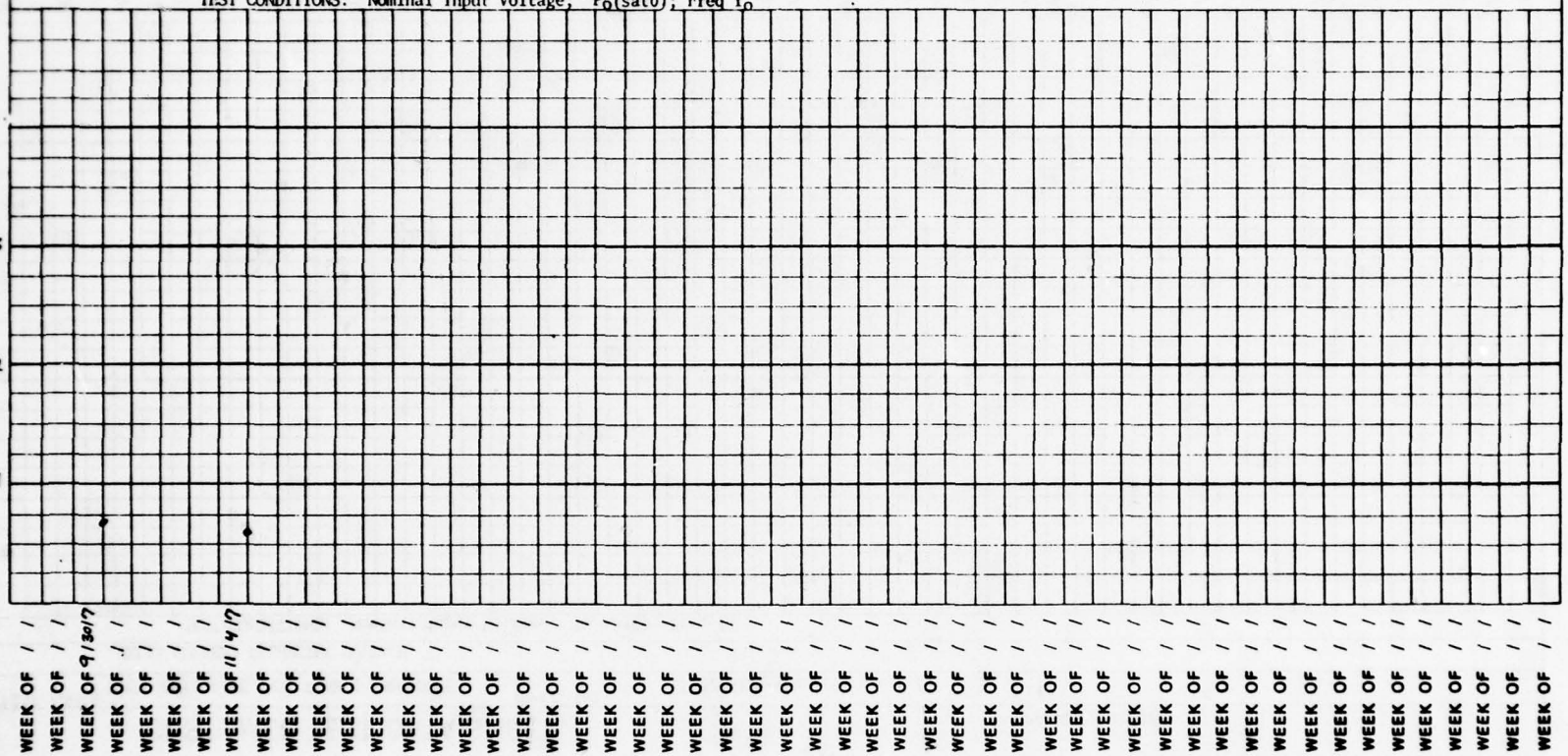
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_O$(sat0); Freq $f_O$




HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___ ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

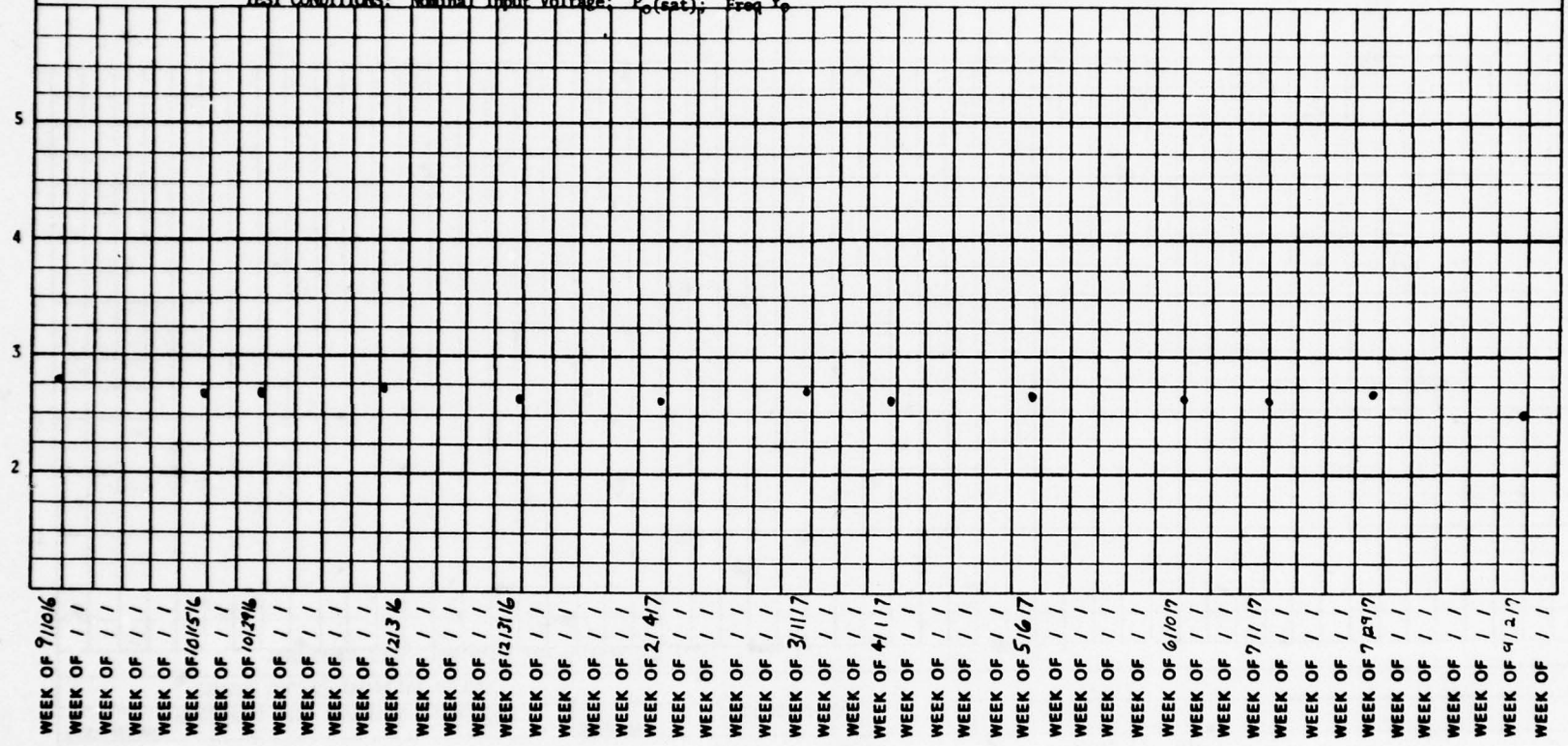
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-4 00 REV. ___ ___

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF / / WEEK OF / / WEEK OF 9/30/7 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF 11/14/9 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

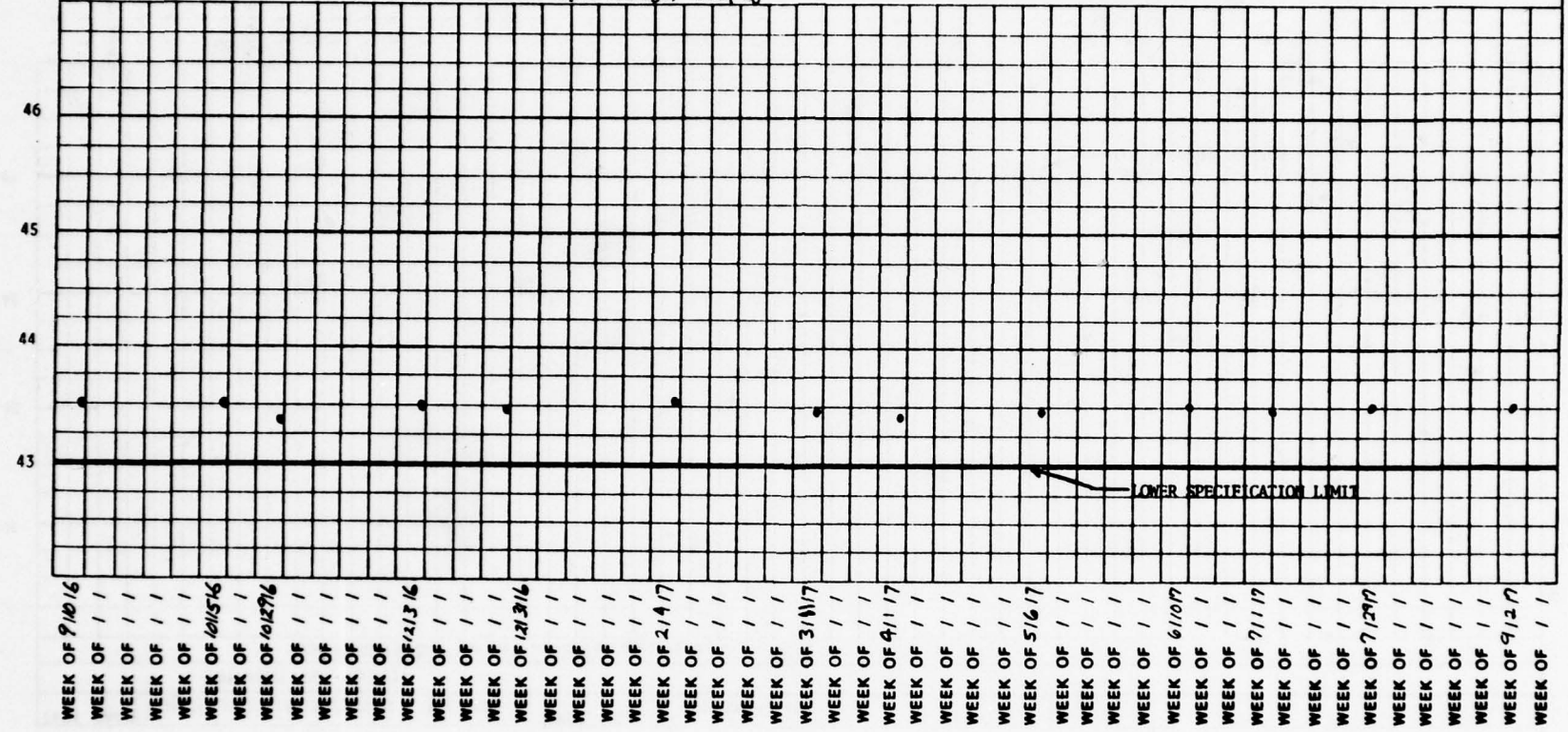
DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 12-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. ~~B200350-122~~ B200350-121 SERIAL NO. 12-1

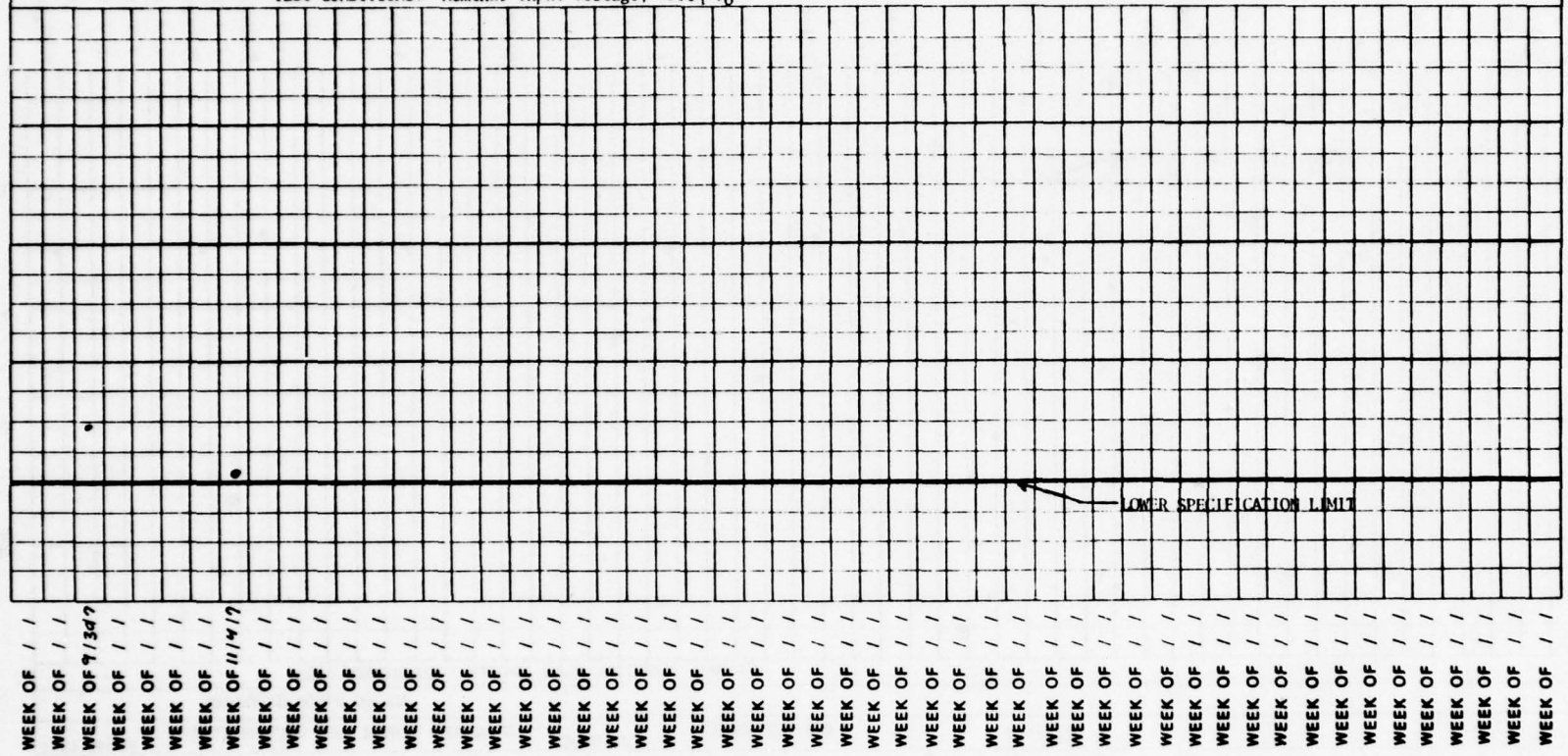
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB 200350-400 REV. ____
MODEL NO. B200350-121 / B200350-122 SERIAL NO. 12-1

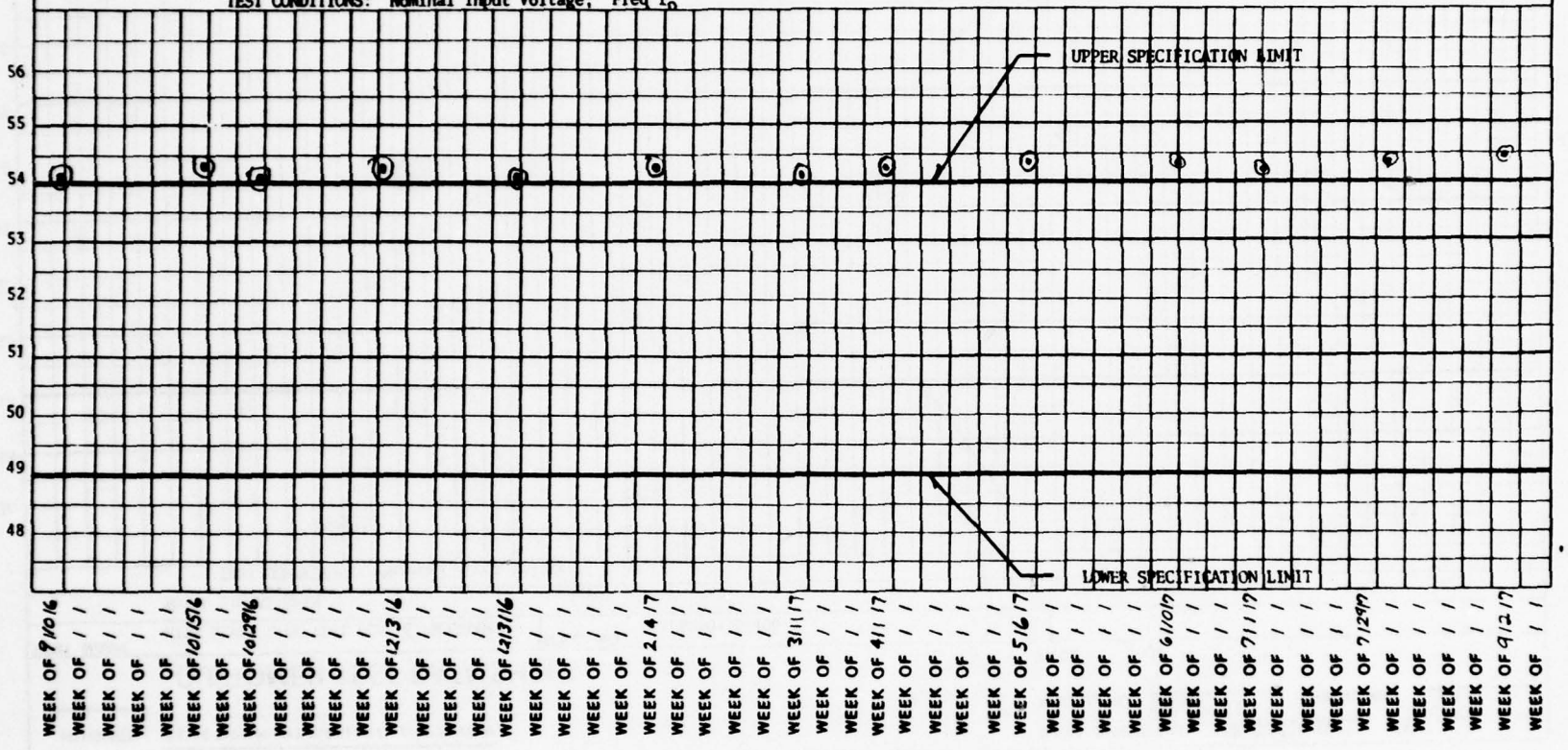
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ out of Spec

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB 200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

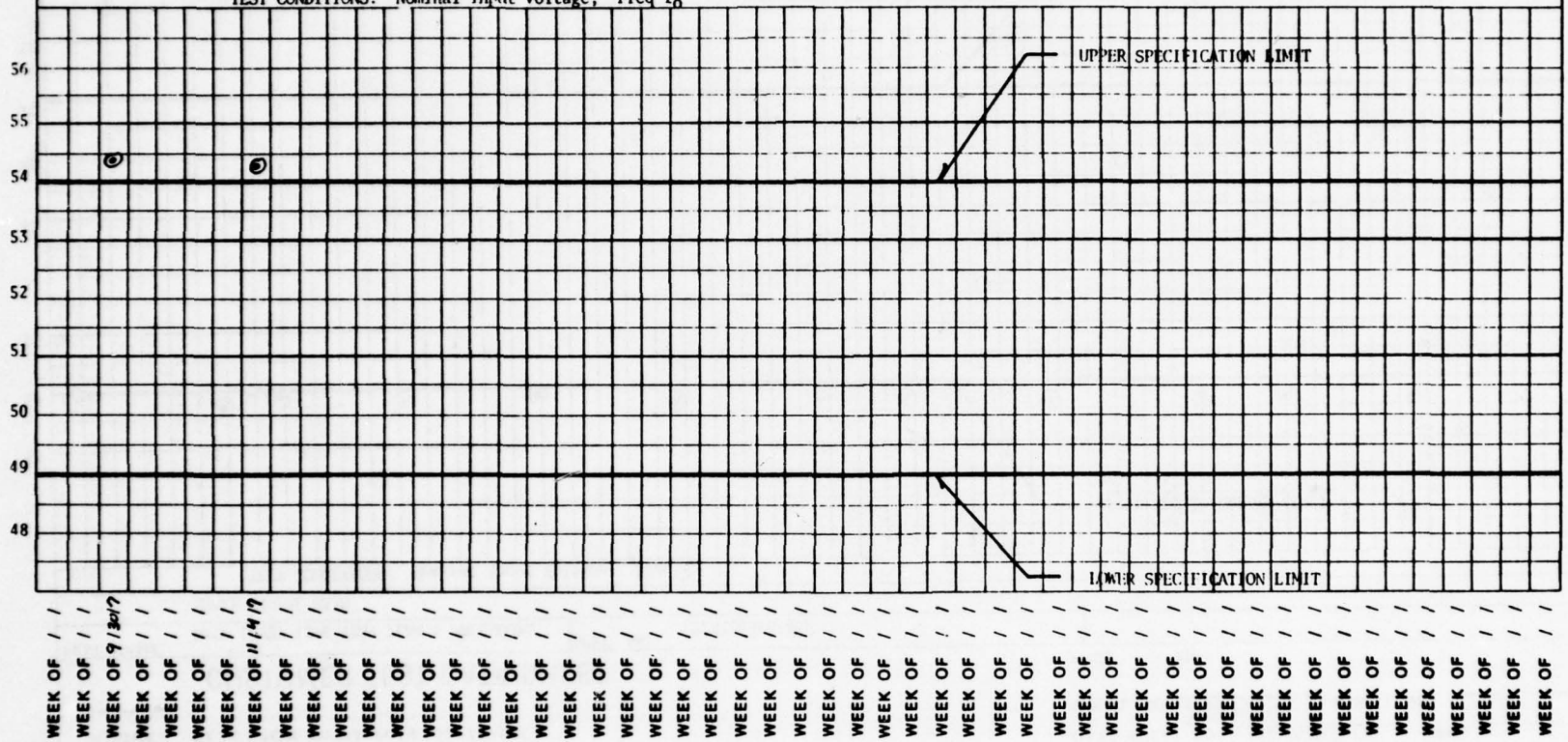
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ OUT OF SPEC

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

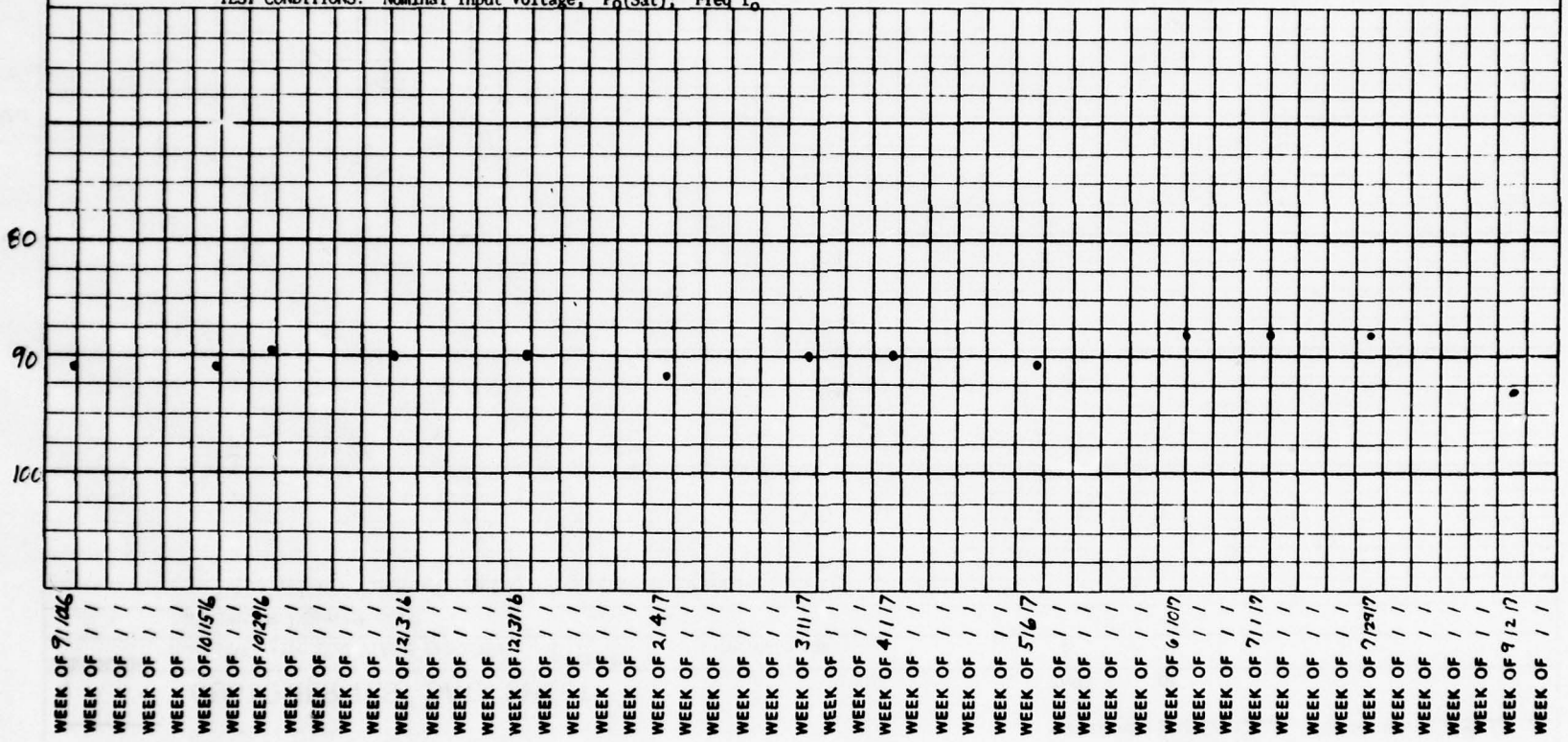
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

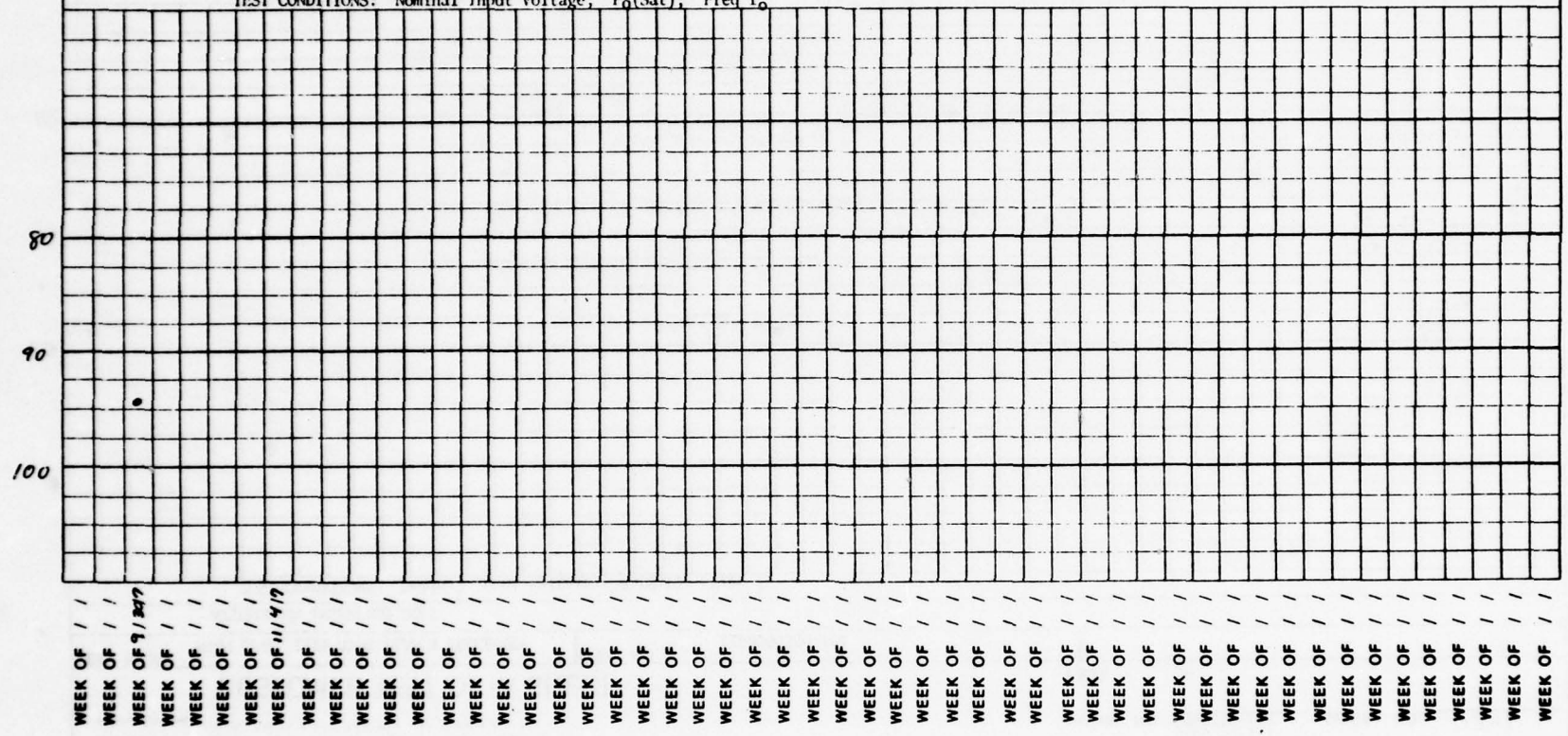
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-131 B200350-132 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

16 15 14 13

WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 5/6/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 6/10/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 7/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 7/29/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 8/26/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/23/17
WEEK OF / /

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-151 B200350-152 SERIAL NO. 12-1

PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 |
|---|---|---|---|
| | ATTENUATOR D.C. RESISTANCE - INPUT | | |
| | TEST CONDITIONS: per para. 4.3.4 | | |

15

14

13

WEEK OF / / WEEK OF / / WEEK OF 9/30/9 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF 11/4/9 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / /

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

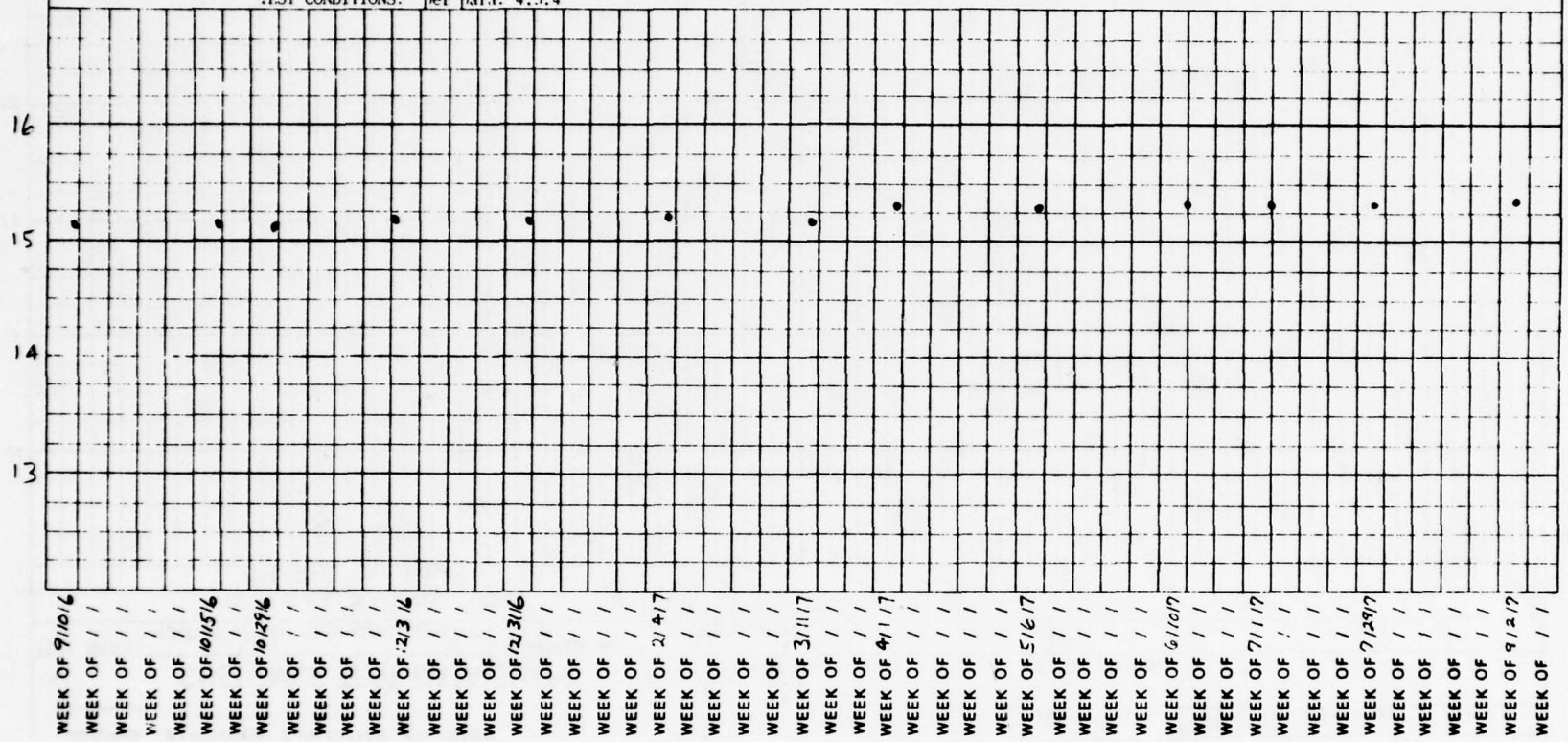
# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO.: LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4




ATTEN VDR D.C. RESISTANCE - OUTPUT (OHMS)

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

PAGE OF

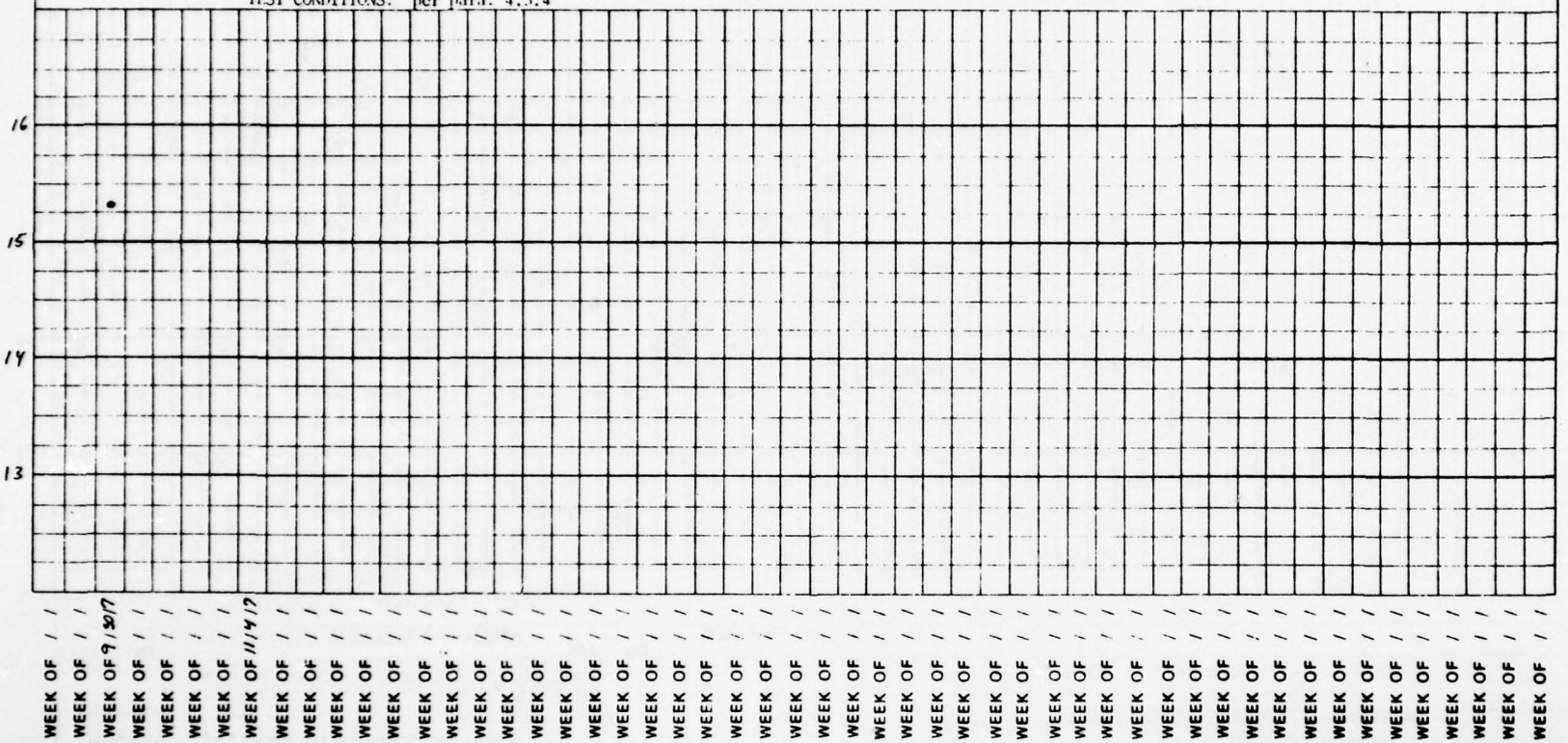
# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4




ATTENUATOR D.C. RESISTANCE - OUTPUT (MSS)

ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-1

# CUSTOMER TEST DATA SHEET

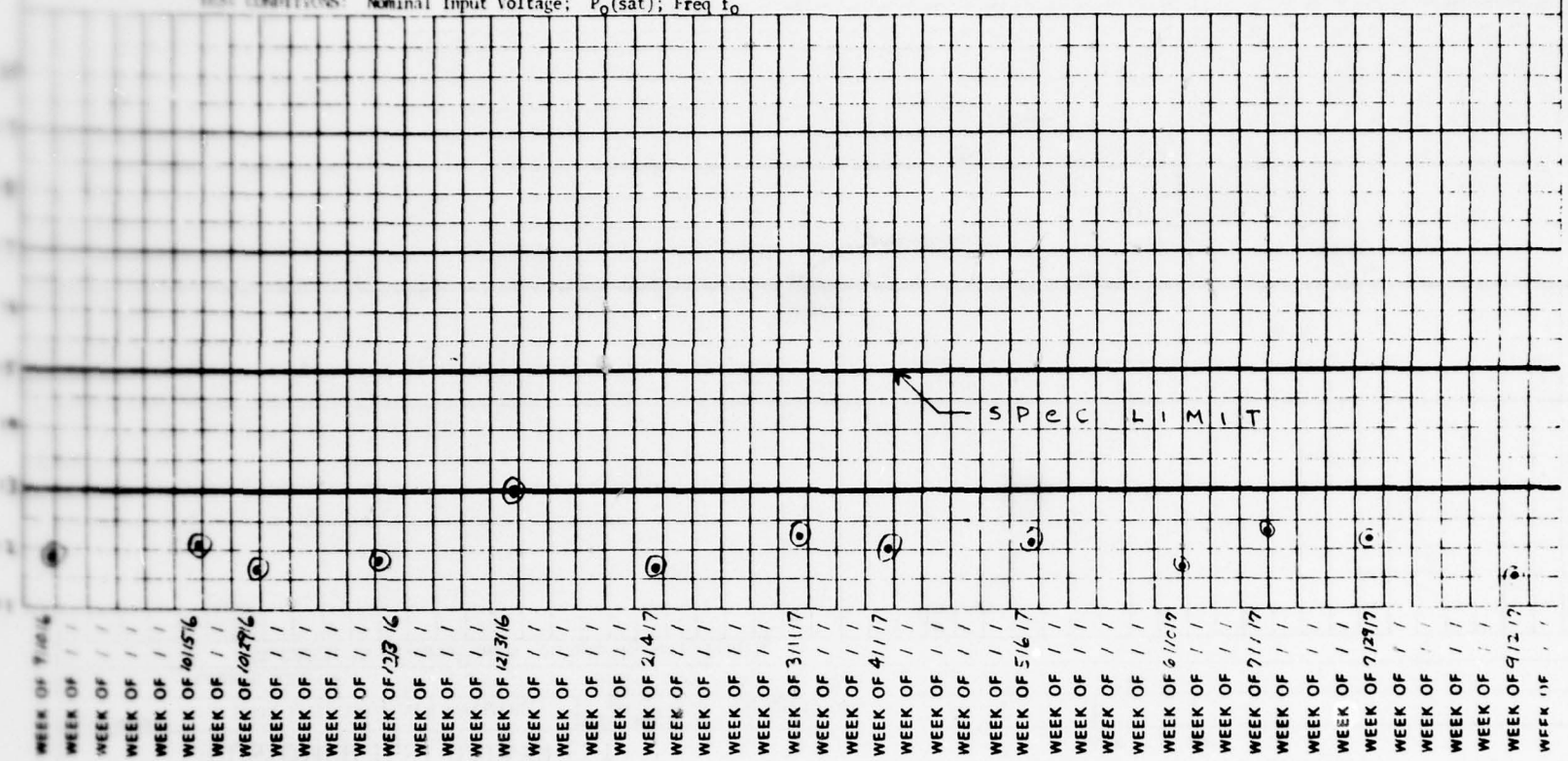
PAGE OF

SPEC. NO. LTPB200350-400

TEST PLAN & PROCEDURE

CUSTOMER ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




○ OUT OF SPEC

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. LSB200350-100 REV. ____

MODEL NO. B200350-121 SERIAL NO. 12-1

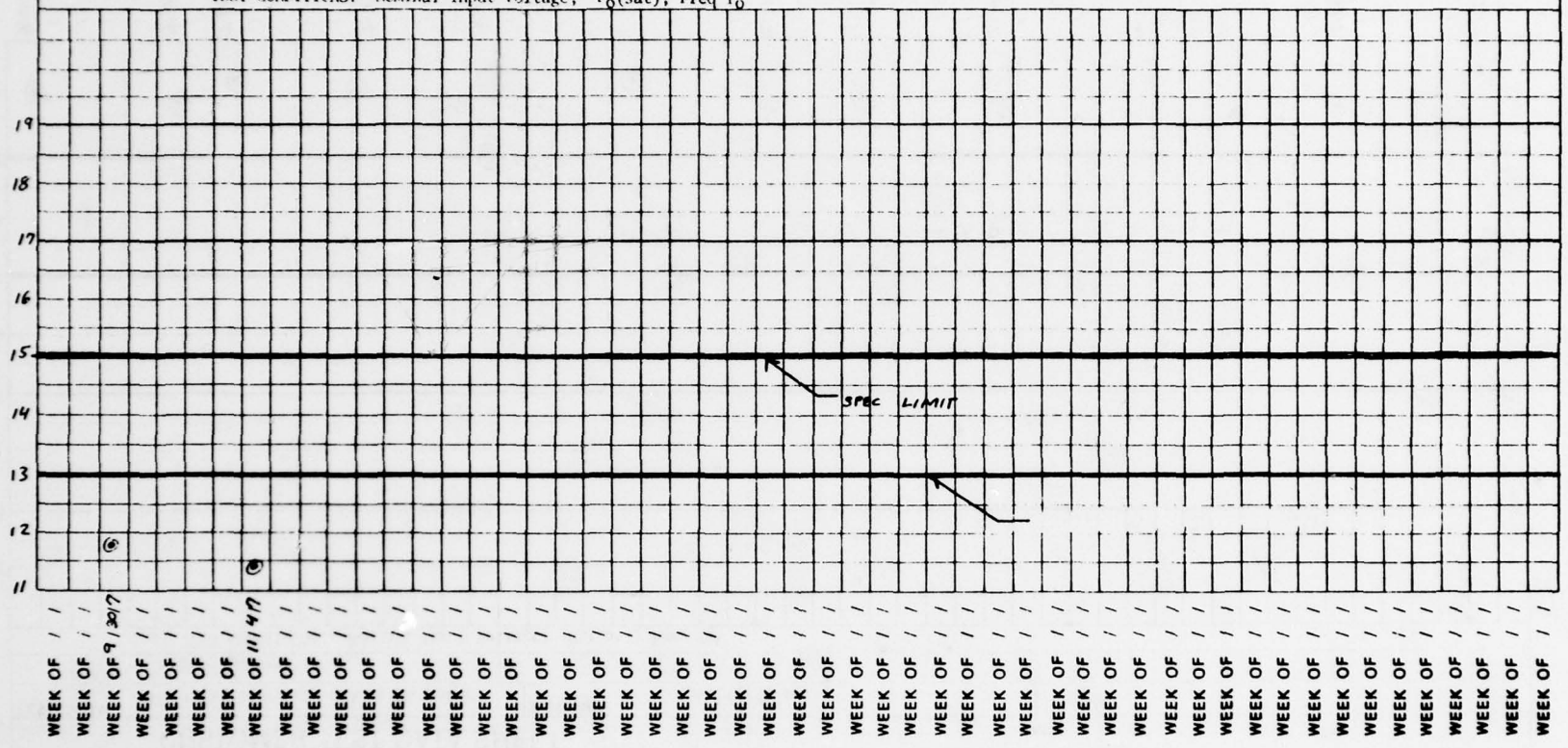
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




⊙ OUT OF SPEC.

HUGHES ELECTRON DYNAMICS DIVISION
9150 W. LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400
ACCEPTANCE TEST DATA

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | PRE FINAL 4/6/71 | FINAL 4/7/71 | 6,600 2/2/72 | 13,267 11/28/72 | 19,963 9/19/73 | 27,474 8/13/74 | 54,651 11/1/77 | / / | / / | / / | / / | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.071 | 2.050 | 2.139 | 2.123 | 2.060 | 2.036 | 2.04 | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.822 | 3.838 | 3.811 | 3.789 | 3.763 | 3.778 | 3.810 | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.441 | 4.442 | 4.15 | 4.112 | 4.100 | 4.085 | 4.080 | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.750 | 0.713 | 0.885 | 0.884 | 0.890 | 0.919 | 0.820 | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.640 | 2.651 | 2.591 | 2.602 | 2.690 | 2.744 | 2.770 | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.30 | 43.15 | 43.15 | 43.10 | 43.05 | 43.25 | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.77 | 53.90 | 54.05 | 54.00 | 54.05 | 53.95 | 54.3 | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 20.1 | 22.3 | 19.8 | 18.7 | 20.1 | 19.3 | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | 1. | | 1. | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. P does not meet specification limit

TWT has 1128 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE

SPEC: LTPB 200350-400

SERIAL NO. 12-2



| SPEC. PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 19963 | 54651 | HOURS |
| 4.1 | CATHODE ACTIVITY, **SECONDS** | 15.0 | | 20.1 | 18.7 | 19.3 | |
| 4.2 | STABILITY | | | ✓ | ✓ | ✓ | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | ✓ | |
| 4.4 | INRUSH CURRENT | | | | | | |
| a) | INTEGRAL >Iss, t=5msec, **ma-sec** | | 30 | 14.5 | 15.0 | 15.3 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 2.1 | 1.5 | .6 | |
| c) | I >Iss PRIOR TO H.V., **AMPS** | | 15 | 7.0 | 5.0 | 4.0 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 14.5 | 15.0 | 12.0 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, **sec** | 60 | 120 | 91.0 | 90 | 96 | |
| f) | I>Iss, t=5msec AFTER H.V., **AMPS** | | .75 | 0.45 | 0.05 | 0 | |
| g) | I WITHIN 3% Iss + >100msec | | | ✓ | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, **VSWR** | | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 2.65 | 2.21 | 2.5 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.18 | 1.15 | 1.18 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.16 | 1.15 | 1.03 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.16 | 1.15 | 1.05 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | | |
| | 1) INPUT CURRENT TLM V | | | 2.050 | 2.060 | 2.04 | |
| | 2) CATHODE CURRENT TLM V | | | 3.838 | 3.763 | 3.81 | |
| | 3) HEATER VOLTAGE TLM V | | | 4.442 | 4.100 | 4.08 | |
| | 4) HELIX CURRENT TLM V | | | 0.713 | .890 | .62 | |
| | 5) CATHODE VOLTAGE TLM V | | | 2.651 | 2.690 | 2.77 | |
| b) | $P_o$ (SAT.), **dBm** | 43 | | 43.30 | 43.10 | 43.25 | |
| c) | $G$ (SAT.), **dB** | 45 | 48 | 46.99 | 47.40 | 45.4 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 19963 | DATA 54651 | HOU |
|---|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.80 | 43.10 | 43.25 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.99 | 47.40 | 45.4 | |
| | 3) I in , AMPS | | | 4.136 | 4.079 | 4.05 | |
| | 4) Pin (DC), WATTS | | 103 | 95.128 | 94.047 | 93.2 | |
| b) | Vin = 33 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.30 | 43.10 | 43.25 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.99 | 47.40 | 45.4 | |
| | 3) I in , AMPS | | | 2.911 | 2.898 | 2.86 | |
| | 4) Pin (DC), WATTS | | 103 | 96.063 | 94.477 | 94.4 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.12 | ±0.18 | ±0.18 | |
| 4.9 | GAIN FLATNESS | | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | ✓ | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | | |
| a) | Gss , dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| b) | G (Var), dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| b) | Vin = 28 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| 4.12 | NOISE FIGURE | | | | | | |
| a) | N.F., dB | | 33 | 28.0 | 28.0 | 27 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 19963 | 54651 | HOU |
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.2 | 10.3 | 10.2 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 22.8 | 21.8 | 21.5 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 29.4 | 28.1 | 28.4 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 27/30 | 24/30 | 28/30 | |
| 4.15 | AM/PM CONVERSION $\frac{\Delta\phi}{\Delta Pi(rf)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.9 | 1.5 | 1.5 | |
| b) | at 0dB | | 3.5 | 1.9 | 1.7 | 1.7 | |
| c) | at -2dB | | 3.5 | 2.0 | 1.9 | 1.8 | |
| d) | at -3dB | | 3.5 | 2.0 | 1.9 | 1.8 | |
| e) | at -4dB | | 3.5 | 2.0 | 2.1 | 1.9 | |
| f) | at -5dB | | 3.5 | 2.0 | 2.2 | 1.9 | |
| g) | at -6dB | | 3.5 | 2.0 | 2.2 | 2.0 | |
| h) | at -7dB | | 3.5 | 1.8 | 2.1 | 2.0 | |
| i) | at -8dB | | 3.5 | 1.5 | 1.8 | 1.8 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHZ LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.005 | 0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | ✓ | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 12.9 | 13.0 | 13.85 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 19963 | DATA 54651 | HOU |
|---|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.80 | 43.10 | 43.25 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.99 | 47.40 | 45.4 | |
| | 3) I in , AMPS | | | 4.136 | 4.089 | 4.05 | |
| | 4) Pin (DC), WATTS | | 103 | 95.128 | 94.047 | 93.2 | |
| b) | Vin = 33 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.30 | 43.10 | 43.25 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.99 | 47.40 | 45.4 | |
| | 3) I in , AMPS | | | 2.911 | 2.898 | 2.86 | |
| | 4) Pin (DC), WATTS | | 103 | 96.063 | 94.977 | 94.4 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.12 | ±0.18 | ±0.18 | |
| 4.9 | GAIN FLATNESS | | | ✓ | ✓ | ✓ | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | | |
| a) | Gss , dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| b) | G (Var), dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 53.90 | 54.05 | 54.3 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.25 | ±0.40 | ±0.14 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| b) | Vin = 28 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.01 | 0.020 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.003 | 0.013 | 0.01 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.003 | 0.017 | 0.006 | |
| 4.12 | NOISE FIGURE | | | | | | |
| a) | N.F., dB | | 33 | 28.0 | 28.0 | 27 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 19963 | 54651 | HOU |
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.2 | 10.3 | 10.2 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 22.8 | 21.8 | 21.5 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 29.4 | 28.1 | 28.4 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 27/30 | 24/30 | 28/30 | |
| 4.15 | AM/PM CONVERSION | | | | | | |
| | $\frac{\Delta\phi}{\Delta Pi(rf)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.9 | 1.5 | 1.5 | |
| b) | at 0dB | | 3.5 | 1.9 | 1.7 | 1.7 | |
| c) | at -2dB | | 3.5 | 2.0 | 1.9 | 1.8 | |
| d) | at -3dB | | 3.5 | 2.0 | 1.9 | 1.8 | |
| e) | at -4dB | | 3.5 | 2.0 | 2.1 | 1.9 | |
| f) | at -5dB | | 3.5 | 2.0 | 2.2 | 1.9 | |
| g) | at -6dB | | 3.5 | 2.0 | 2.2 | 2.0 | |
| h) | at -7dB | | 3.5 | 1.8 | 2.1 | 2.0 | |
| i) | at -8dB | | 3.5 | 1.5 | 1.8 | 1.8 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHZ LINEAR INTERVAL , ns/Mhz | | 0.10 | .005 | 0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | ✓ | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 12.9 | 13.0 | 13.85 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2
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# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT), FREQ. $f_o$

| TEST CONDITIONS NOMINAL INPUT VOLTAGE — TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 258 | 728 | 1059 | 1460 | 1656 | 1876 | 2114 | 2278 | 2391 | 2530 | | 2884 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/3/71 | week of 5/23/71 | week of 6/7/71 | week of 6/24/71 | week of 7/2/71 | week of 7/14/71 | week of 7/24/71 | week of 7/31/71 | week of 8/5/71 | week of 8/11/71 | week of 8/19/71 | week of 8/26/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.106 | 2.084 | 2.091 | 2.023 | 2.091 | 2.136 | 2.119 | 2.119 | 2.097 | 2.117 | 2.072 | 2.132 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.838 | 3.836 | 3.837 | 3.838 | 3.835 | 3.834 | 3.830 | 3.832 | 3.827 | 3.831 | 3.834 | 3.831 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.105 | 4.099 | 4.101 | 4.087 | 4.096 | 4.115 | 4.106 | 4.100 | 4.100 | 4.109 | 4.100 | 4.113 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .740 | .788 | .751 | .756 | .791 | .806 | .804 | .8237 | .813 | .811 | .812 | .818 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.647 | 2.699 | 2.694 | 2.788 | 2.600 | 2.577 | 2.638 | 2.704 | 2.683 | 2.627 | 2.703 | 2.593 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.30 | 43.30 | 43.30 | 43.25 | 43.25 | 43.25 | 43.30 | 43.25 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.48 | 53.58 | 53.58 | 53.28 | 53.71 | 53.63 | 53.48 | 53.73 | 53.68 | 53.80 | 53.68 | 53.68 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 22.2 | 22.1 | | | | | | 21.8 | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | 7/21/71 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-159 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 3162 | 3212 | 3355 | 3523 | 3710 | 3840 | 4013 | 4176 | 4324 | 4512 | 4685 | 4875 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 9/7/71 | week of 9/10/71 | week of 9/16/71 | week of 9/23/71 | week of 10/1/71 | week of 10/7/71 | week of 10/14/71 | week of 10/21/71 | week of 10/27/71 | week of 11/4/71 | week of 11/12/71 | week of 11/19/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.061 | 2.104 | 2.097 | 2.025 | 2.055 | 2.075 | 2.105 | 2.070 | 2.091 | 2.100 | 2.110 | 2.110 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.832 | 3.828 | 3.828 | 3.828 | 3.830 | 3.821 | 3.826 | 3.830 | 3.824 | 3.827 | 3.823 | 3.829 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.085 | 4.106 | 4.102 | 4.086 | 4.098 | 4.101 | 4.105 | 4.097 | 4.105 | 4.099 | 4.106 | 4.100 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .803 | .817 | .808 | .822 | .843 | .793 | .828 | .834 | .843 | .841 | .851 | .831 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.815 | 2.649 | 2.680 | 2.818 | 2.722 | 2.682 | 2.655 | 2.720 | 2.680 | 2.691 | 2.655 | 2.669 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.43 | 43.30 | 43.30 | 43.35 | 43.35 | 43.25 | 43.30 | 43.30 | 43.25 | 43.25 | 43.15 | 43.20 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.58 | 53.20 | 53.50 | 53.63 | 53.58 | 53.68 | 53.60 | 53.50 | 53.45 | 53.50 | 53.30 | 53.40 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 11/2/71 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 4995 | 5163 | 5374 | 5523 | 5611 | 5804 | 5972 | 6134 | 6329 | 6473 | 6655 | 6792 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 11/24/71 | week of 12/ 1/71 | week of 12/10/71 | week of 12/16/71 | week of 12/22/71 | week of 12/30/71 | week of 1 /6 /72 | week of 1/13/72 | week of 1/22/72 | week of 1/27/72 | week of 2/4 /72 | week of 2 /10/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.012 | 2.119 | 2.099 | 2.109 | 2.099 | 2.055 | 2.100 | 2.093 | 2.10 | 2.11 | 2.11 | 2.06 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.820 | 3.817 | 3.816 | 3.818 | 3.817 | 3.818 | 3.817 | 3.816 | 3.82 | 3.82 | 3.82 | 3.81 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.086 | 4.110 | 4.101 | 4.107 | 4.100 | 4.098 | 4.099 | 4.105 | 4.10 | 4.11 | 4.11 | 4.11 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .842 | .853 | .850 | .857 | .851 | .855 | .851 | .865 | .86 | .83 | .84 | .87 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.813 | 2.622 | 2.681 | 2.643 | 2.677 | 2.727 | 2.660 | 2.662 | 2.66 | 2.63 | 2.64 | 2.67 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.20 | 43.20 | 43.25 | 43.25 | 43.30 | 43.25 | 43.30 | 43.30 | 43.30 | 43.25 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.30 | 53.35 | 53.40 | 53.60 | 53.50 | 53.60 | 53.50 | 53.45 | 53.40 | 53.40 | 53.40 | 53.80 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | 22.3 | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 1/26/72 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 6966 | 7111 | 7257 | 7400 | 7601 | 7720 | 7889 | 8011 | 8250 | 8395 | 8591 | 8753 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 2/17/72 | week of 2/24/72 | week of 3/3/72 | week of 3/9/72 | week of 3/17/72 | week of 3/22/72 | week of 3/30/72 | week of 4/7/72 | week of 4/21/72 | week of 4/27/72 | week of 5/5/72 | week of 5/12/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.06 | 2.12 | 2.06 | 2.10 | 2.12 | 2.03 | 2.10 | 2.04 | 2.07 | 2.10 | 2.09 | 2.08 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.81 | 3.81 | 3.81 | 3.81 | 3.81 | 3.80 | 3.81 | 3.80 | 3.81 | 3.80 | 3.81 | 3.80 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.11 | 4.11 | 4.11 | 4.11 | 4.11 | 4.09 | 4.10 | 4.09 | 4.10 | 4.10 | 4.09 | 4.10 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .84 | .85 | .84 | .85 | .84 | .83 | .85 | .84 | .85 | .88 | .86 | .88 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.65 | 2.61 | 2.65 | 2.65 | 2.63 | 2.76 | 2.68 | 2.77 | 2.67 | 2.66 | 2.68 | 2.70 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.25 | 43.25 | 43.35 | 43.40 | 43.30 | 43.30 | 43.35 | 43.40 | 43.35 | 43.35 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 53.80 | 54.00 | 53.90 | 53.90 | 54.00 | 53.90 | 53.90 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 4/19/72 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-199 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 8899 | 9089 | 9257 | 9429 | 9591 | 9764 | 9932 | 10099 | 10267 | 10433 | 10596 | 10766 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/18/72 | week of 5/26/72 | week of 6/2/72 | week of 6/9/72 | week of 6/16/72 | week of 6/23/72 | week of 6/30/72 | week of 7/7/72 | week of 7/14/72 | week of 7/21/72 | week of 7/28/72 | week of 8/4/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.09 | 2.07 | 2.10 | 1.99 | 2.05 | 2.07 | 2.05 | 2.07 | 2.11 | 2.09 | 2.03 | 2.09 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.81 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.79 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.10 | 4.10 | 4.10 | 4.08 | 4.09 | 4.10 | 4.09 | 4.10 | 4.11 | 4.10 | 4.09 | 4.10 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .88 | .87 | .88 | .88 | .88 | .88 | .89 | .89 | .88 | .88 | .88 | .88 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.69 | 2.71 | 2.66 | 2.67 | 2.73 | 2.70 | 2.71 | 2.70 | 2.64 | 2.66 | 2.78 | 2.67 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.40 | 43.45 | 43.40 | 43.45 | 43.45 | 43.40 | 43.40 | 43.35 | 43.35 | 43.40 | 43.40 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.10* | 53.90 | 53.90 | 54.00 | 54.00 | 54.00 | 53.90 | 54.00 | 54.00 | 54.00 | 54.00 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-139 SERIAL NO. 12-2

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

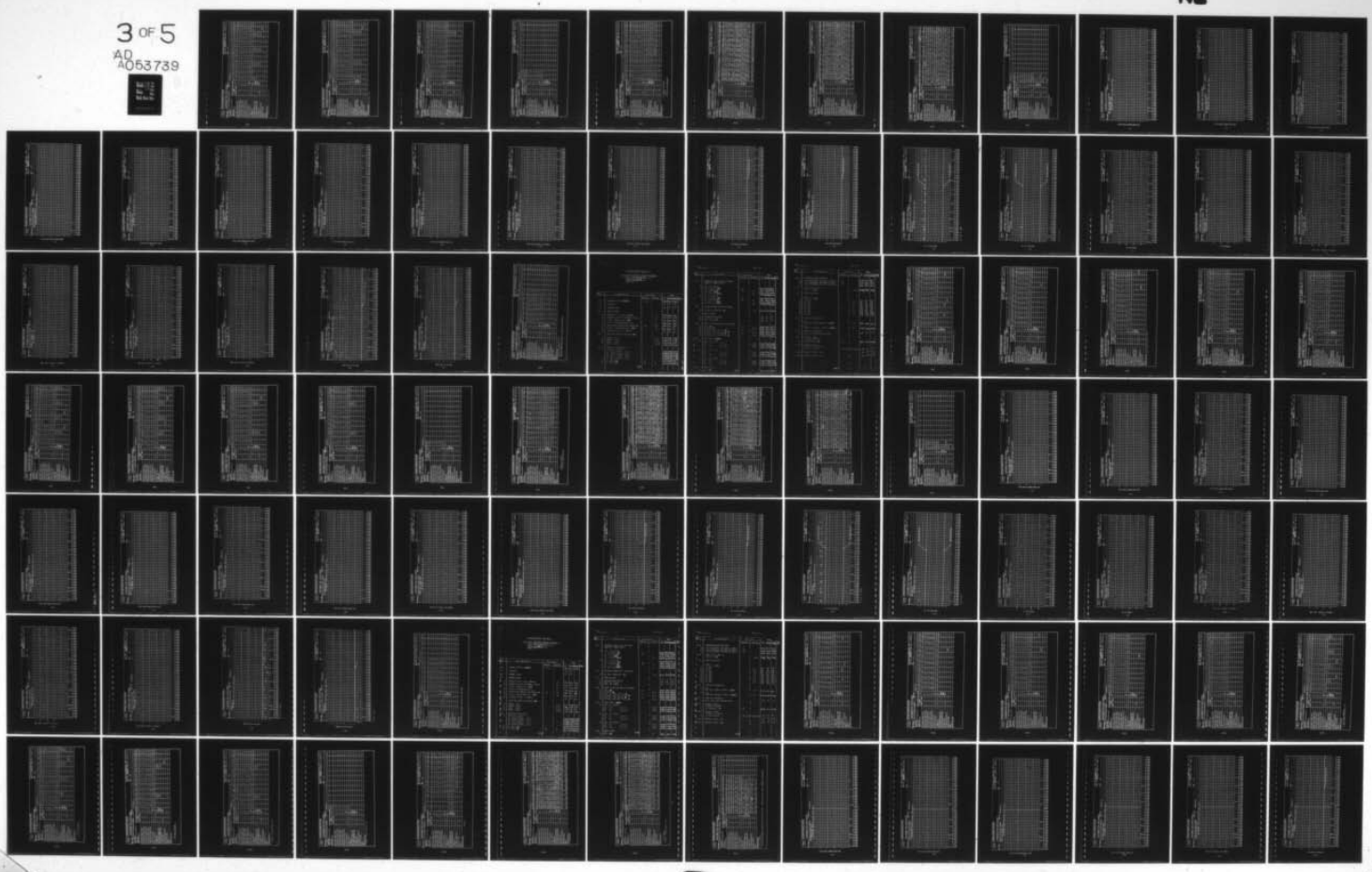
TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 10928 week of 8/11/72 | 11090 week of 8/18/72 | 11232 week of 8/28/72 | 11304 week of 8/31/72 | 11381 week of 9/8/72 | 11544 week of 9/15/72 | 11710 week of 9/22/72 | 11880 week of 9/29/72 | 12042 week of 10/6/72 | 12207 week of 10/13/72 | 12371 week of 10/20/72 | 12545 week of 10/27/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.03 | 2.04 | 2.04 | 2.03 | 2.04 | 1.98 | 2.04 | 2.08 | 2.08 | 2.08 | 2.11 | 2.04 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.78 | 3.78 | 3.79 | 3.78 | 3.79 | 3.78 | 3.79 | 3.79 | 3.77 | 3.78 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.09 | 4.09 | 4.10 | 4.09 | 4.09 | 4.08 | 4.10 | 4.10 | 4.10 | 4.08 | 4.10 | 4.09 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .87 | .87 | .86 | .87 | .87 | .88 | .88 | .88 | .87 | .86 | .88 | .88 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.76 | 2.77 | 2.72 | 2.74 | 2.75 | 2.72 | 2.71 | 2.68 | 2.71 | 2.69 | 2.64 | 2.67 |
| $P_o$ (SAT) FREQ $f_o$ (PARA 4.13) | 43 | -- | dbm | 43.35 | 43.45 | 43.35 | 43.45 | 43.45 | 43.50 | 43.50 | 43.35 | 43.35 | 43.40 | 43.30 | 43.30 |
| $G_{ss}$ FREQ $f_o$ (PARA 4.31) | 49 | 54 | db | 53.8 | 53.90 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 |
| $L_i$ INSERTION LOSS | | | db | | | | 76.50 | | | 76.80 | | | 76.50 | | |
| $R_{ATN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | 17.00 | | | 17.02 | | | 17.08 | | |
| $R_{ATN}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | 17.13 | | | 17.16 | | | 17.20 | | |
| $T_g$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | 9/7/72 | | | 9/29/72 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

AD-A053 739 HUGHES AIRCRAFT CO TORRANCE CALIF ELECTRON DYNAMICS DIV F/G 9/1
DEFENSE SATELLITE COMMUNICATIONS SYSTEM TRAVELING WAVE TUBE AMP--ETC(U)
FEB 78 M L KAHN F04701-74-C-0542
UNCLASSIFIED NL

3 OF 5
AD A053739



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 12707 week of 11/3/72 | 12848 week of 11/10/72 | 13016 week of 11/17/72 | 13129 week of 11/22/72 | 13325 week of 12/1/72 | 13498 week of 12/8/72 | 13658 week of 12/15/72 | 13794 week of 12/21/72 | 13871 week of 12/29/72 | 14038 week of 1/5/73 | 14206 week of 1/12/73 | 14367 week of 1/19/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.04 | 1.99 | 2.07 | 2.06 | 2.12 | 2.06 | 2.04 | 2.08 | 2.02 | 2.04 | 2.07 | 2.05 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.79 | 3.78 | 3.79 | 3.80 | 3.78 | 3.78 | 3.78 | 3.77 | 3.78 | 3.78 | 3.78 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.09 | 4.08 | 4.10 | 4.10 | 4.11 | 4.10 | 4.09 | 4.10 | 4.09 | 4.10 | 4.10 | 4.10 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .87 | .87 | .87 | .87 | .87 | .87 | .87 | .86 | .86 | .87 | .87 | .85 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.77 | 2.74 | 2.70 | 2.69 | 2.59 | 2.61 | 2.74 | 2.69 | 2.76 | 2.61 | 2.70 | 2.73 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.40 | 43.35 | 43.40 | 43.35 | 43.30 | 43.30 | 43.30 | 43.40 | 43.40 | 43.30 | 43.30 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10* | 54.20* | 54.10* | 54.00 | 53.90 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 * |
| $I_L$ INSERTION LOSS | | | db | 79.00 | | | 76.00 | | | 77.00 | | | 80.00 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.08 | | | 17.11 | | | 17.14 | | | 17.12 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.22 | | | 17.22 | | | 17.25 | | | 17.26 | | |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | 19.80 | | | 18.00 | | | 20.40 | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | 1/12/73 | |
| SIGNIFICANT EVENT NOTES | | | | 1 | 1 | 1 | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 * DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 14605 week of 1/29/73 | 14696 week of 2/2/73 | 14857 week of 2/9/73 | 15026 week of 2/16/73 | 15185 week of 2/23/73 | 15358 week of 3/2/73 | 15521 week of 3/9/73 | 15693 week of 3/16/73 | 15853 week of 3/23/73 | 16016 week of 3/30/73 | 16183 week of 4/6/73 | 16349 week of 4/13/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.06 | 2.10 | 2.06 | 2.10 | 2.13 | 2.08 | 2.09 | 2.09 | 2.06 | 2.09 | 2.07 | 2.07 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.78 | 3.78 | 3.77 | 3.78 | 3.70 | 3.80 | 3.79 | 3.70 | 3.80 | 3.77 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.10 | 4.11 | 4.10 | 4.10 | 4.11 | 4.10 | 4.11 | 4.11 | 4.10 | 4.11 | 4.10 | 4.10 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .86 | .85 | .87 | .88 | .87 | .87 | .87 | .87 | .88 | .87 | .88 | .87 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.69 | 2.64 | 2.72 | 2.65 | 2.58 | 2.68 | 2.63 | 2.63 | 2.73 | 2.68 | 2.69 | 2.68 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.20 | 43.30 | 43.15 | 43.15 | 43.25 | 43.20 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 53.80 | 54.00 | 53.55 | 53.80 | 53.90 | 53.80 | 53.80 | 53.70 | 53.80 | 53.80 | 54.20* |
| $L_L$ INSERTION LOSS | | | db | 76.00 | | | 76.20 | | | | | | 76.30 | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.15 | | | 17.17 | | | | | | 17.21 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.30 | | | 17.31 | | | | | | 17.32 | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 17.90 | | | 18.80 | | | | | | 18.90 | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | 4/9/73 | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | 1. |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 SERIAL NO. 12-2

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT): FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 16517 week of 4/20/73 | 16659 week of 4/27/73 | 16826 week of 5/4/73 | 16993 week of 5/11/73 | 17164 week of 5/18/73 | 17325 week of 5/25/73 | 17499 week of 6/1/73 | 17666 week of 6/9/73 | 17800 week of 6/15/73 | 17977 week of 6/22/73 | 18117 week of 6/29/73 | 18284 week of 7/6/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.12 | 2.05 | 2.16 | 2.06 | 1.98 | 2.07 | 2.07 | 2.05 | 2.07 | 2.00 | 2.04 | 2.04 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.76 | 3.78 | 3.77 | 3.77 | 3.78 | 3.77 | 3.76 | 3.76 | 3.77 | 3.76 | 3.76 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.11 | 4.09 | 4.12 | 4.10 | 4.08 | 4.09 | 4.10 | 4.10 | 4.10 | 4.09 | 4.10 | 4.09 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .87 | .88 | .88 | .86 | .88 | .87 | .88 | .88 | .87 | .88 | .87 | .87 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.59 | 2.74 | 2.49 | 2.68 | 2.68 | 2.69 | 2.69 | 2.73 | 2.66 | 2.71 | 2.70 | 2.74 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.2) | 43 | -- | dbm | 43.25 | 43.30 | 43.25 | 43.25 | 43.40 | 43.35 | 43.35 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 |
| $G_{SS}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10# | 54.10# | 54.10# | 54.10# | 54.00 | 54.10# | 54.10# | 54.00 | 54.10# | 54.10# | 54.10# | 54.10# |
| $L_L$ INSERTION LOSS | | | db | | | | 76.00 | | | | | | 77.00 | | |
| $R_{AMI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | 17.32 | | | | | | 17.26 | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | 17.42 | | | | | | 17.40 | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | 17.70 | | | | | | 17.80 | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1 | 1 | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | 1 |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 # DOES NOT MEET SPECIFICATION LIMIT

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90505

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$ (SAT) FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 18451 | 18763 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 7/13/73 | week of 7/26/73 | | | | | | | | | | |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.98 | 2.05 | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.76 | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.09 | 4.10 | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .88 | .85 | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.76 | 2.68 | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | | | | | | | | | | |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. _____

MODEL NO. B200350-121 B200350-139 SERIAL NO. 12-2

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 19,449 | 20,180 | 20,878 | 21,553 | 22,177 | 22,957 | 23,589 | 24,359 | 24,967 | 25,658 | 26,376 | 27,044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/73 | 9/28/73 | 10/26/73 | 11/30/73 | 12/28/73 | 1/31/74 | 2/28/74 | 4/1/74 | 4/29/74 | 5/28/74 | 6/26/74 | 7/26/74 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.01 | 2.03 | 2.04 | 2.01 | 2.06 | 2.07 | 2.06 | 2.06 | 2.10 | 2.02 | 2.01 | 2.05 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.77 | 3.76 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.10 | 4.10 | 4.09 | 4.08 | 4.09 | 4.09 | 4.09 | 4.09 | 4.10 | 4.08 | 4.08 | 4.09 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .85 | .85 | .86 | .82 | .81 | .80 | .81 | .77 | .89 | .81 | .81 | .90 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.75 | 2.72 | 2.74 | 2.78 | 2.66 | 2.62 | 2.66 | 2.66 | 2.61 | 2.74 | 2.76 | 2.71 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.20 | 43.25 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.3 | 43.20 | 43.30 | 43.25 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.0 | 54.0 | 54.0 | 54.0 | 54.1# | 54.0 | 54.0 | 54.1# | 54.0 | 54.1# | 54.0 | 53.9 |
| $L_L$ INSERTION LOSS | | | db | 76.6 | 76.0 | 75.9 | 76.5 | 76.7 | 77.1 | 76.7 | 75.6 | 75.0 | 75.3 | 75.3 | 75.00 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.38 | 17.43 | 17.43 | 17.43 | 17.41 | 17.39 | 17.40 | 17.5 | 17.48 | 17.43 | 17.42 | 17.50 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.50 | 17.52 | 17.55 | 17.57 | 17.54 | 17.52 | 17.53 | 17.6 | 17.57 | 17.57 | 17.57 | 17.60 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 21.2 | 20.8 | * | | | 21.0 | 20.2 | 20.7 | 21.2 | 2.10 | 21.0 | 20.04 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8/10/73 | 8/10/73 | 8/10/73 | 8/10/73 | 11/28/73 | 11/28/73 | 11/28/73 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 |
| SIGNIFICANT EVENT NOTES | | | | | | | | / | | | / | | / | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

*DUAL RECORDER OUT FOR REPAIR
(10-26-73)

/. # DOES NOT MEET SPECIFICATION LIMITS

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-111 / B200350-121 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: 1000 HOUR LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 27796 | 28 536 | 29.307 | 30018 | 30,615 | 31402 | 32,003 | 32.702 | 33,469 | 34,228 | 34879 | 35,599 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/14 | 9/20/14 | 11/1/74 | 12/2/14 | 12/27/14 | 1/29/15 | 2/26/15 | 3/28/15 | 4/28/15 | 5/31/15 | 7/1/75 | 8/1/15 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.988 | 2059 | 2.08 | 2.00 | 2.04 | 2.09 | 2.02 | 2.02 | 2.04 | 2.04 | 2.01 | 2.04 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3762 | 3.783 | 3.76 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.77 | 3.78 | 3.77 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.079 | 4.086 | 4.09 | 4.08 | 4.08 | 4.08 | 4.08 | 4.08 | 4.08 | 4.08 | 4.08 | 4.08 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .824 | .83 | .82 | .82 | .82 | .82 | .84 | .84 | .83 | .83 | .80 | .83 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.791 | 2.710 | 2.64 | 2.78 | 2.73 | 2.72 | 2.76 | 2.71 | 2.70 | 2.73 | 2.77 | 2.70 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.2 | 43.3 | 43.3 | 43.25 | 43.3 | 43.35 | 43.35 |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.9 | 53.9 | 54.1* | 54.1* | 53.9 | 53.8 | 53.8 | 54.1* | 54.0 | 54.10* | 54.1* | 54.1* |
| $I_L$ INSERTION LOSS | | | db | 75.0 | 75.4 | 76.2 | 75.2 | 75.4 | 76.4 | 76.0 | 76.0 | 76.1 | 75.0 | 74.0 | 75.0 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.50 | 17.58 | 17.53 | 17.56 | 17.60 | 17.47 | 17.54 | 17.54 | 1753 | 17.56 | 17.57 | 17.59 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.62 | 17.64 | 17.64 | 17.66 | 17.67 | 17.60 | 17.67 | 17.67 | 17.69 | 17.69 | 17.69 | 17.70 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 20.2 | 20.0 | 19.8 | 20.2 | 20.6 | 20.8 | 20.4 | 19.8 | 20.0 | 20.0 | 19.5 | 19.0 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-24-74 | 7-24-4 | 7-24-4 | 11-21-4 | 11-21-4 | 11-21-4 | 1-31-5 | 1-31-5 | 1-31-5 | 4-1-5 | 4-1-5 | 7-30-5 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | WPN | WPN | WPN | W.P.N | W.P.N | WPN | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N |

SIGNIFICANT EVENT NOTES
* OUT OF SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 36,387 | 37,132 | 37,799 | 38,569 | 39,509 | 4,0009 | 40,677 | 41,485 | 42,028 | 42,845 | 43,525 | 45,064 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 9/2/75 | 10/4/15 | 11/1/15 | 12/3/15 | 1/13/16 | 2/13/16 | 3/12/16 | 4/15/16 | 4/28/16 | 6/1/16 | 6/30/16 | 9/8/16 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.08 | 2.08 | 2.04 | 2.08 | 2.10 | 2.08 | 2.04 | 2.05 | 2.05 | 2.02 | 2.0 | 2.00 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.78 | 3.78 | 3.79 | 3.78 | 3.78 | 3.80 | 3.79 | 3.79 | 3.79 | 3.80 | 3.79 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.09 | 4.09 | 4.08 | 4.09 | 4.10 | 4.10 | 4.09 | 4.09 | 4.09 | 4.09 | 4.09 | 4.08 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .82 | .82 | .81 | .80 | .77 | .80 | .80 | .78 | .78 | .79 | .78 | .80 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.63 | 2.64 | 2.70 | 2.62 | 2.57 | 2.63 | 2.69 | 2.70 | 2.66 | 2.75 | 2.75 | 2.78 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.3 | 43.3 | 43.3 | 43.25 | 43.3 | 43.25 | 43.25 | 43.25 | 43.25 | 43.30 | 43.45 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.1* | 54.1* | 54.1* | 54.05* | 54.05* | 54.05* | 54.15* | 54.15* | 54.15* | 54.15* | 54.10* | 54.15 |
| $I_L$ INSERTION LOSS | | | db | 75.0 | 74.9 | 75.1 | 75.6 | 77 | 75.1 | 74.5 | 75.5 | 74.5 | 73.6 | 76.0 | 75.1 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.56 | 17.55 | 17.58 | 17.56 | 17.55 | 17.56 | 17.60 | 17.58 | 17.56 | 17.60 | 17.55 | 17.57 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.71 | 17.70 | 17.72 | 17.71 | 17.70 | 17.73 | 17.75 | 17.73 | 17.72 | 17.75 | 17.71 | 17.75 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 18.7 | 18.3 | 18.3 | 19.3 | 18.4 | 19.0 | 19.0 | 19.0 | 19.7 | 19.0 | 19.5 | 18.6 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-30-5 | 7-30-5 | 10-29-5 | 10-29-5 | 10-29-5 | 2-3-6 | 2-3-6 | 2-3-6 | 2-3-6 | 5-7-6 | 5-12-6 | 7-23-6 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | M.S.K | M.S.K | M.S.K | W.P.N | M.S.K | W.P.N |

SIGNIFICANT EVENT NOTES
* out of specification limit

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 45,856 | 46,233 | 46,982 | 42,688 | 48,391 | 49248 | 49,679 | 50,546 | 51,179 | 51681.7 EST 51981.7 | 52395.1 | 53,130 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | | | | 10/13/76 | 10/29/76 | 11/29/76 | 12/29/76 | 2/2/77 | 3/10/77 | 3/29/77 | 5/6/77 | 6/6/77 | 6/24/77 | 7/29/77 | 8/29/77 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.072 | 2.210 | 2.236 | 2.285 | 3.070 2.274 | 1.923 | 2.061 | 1.98 | 1.98 | 2.080 | 2.071 | 2.025 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.80 | 3.80 | 3.804 | 3.804 | 3.800 | 3.800 | 3.802 | 3.807 | 3.806 | 3.802 | 3.803 | 3.804 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.10 | 4.09 | 4.090 | 4.103 | 4.092 | 4.081 | 4.097 | 4.083 | 4.081 | 4.08 | 4.089 | 4.085 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .789 | .801 | .806 | .792 | .788 | .792 | .794 | .820 | .816 | .784 | .820 | .809 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.63* | 2.74 | 2.762 | 2.65* | 2.664 | 2.679 | 2.684 | 2.800 | 2.820 | 2.667 | 2.729 | 2.77 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45* | 43.35* | 43.45* | 43.30 | 43.45* | 43.40 | 43.30 | 43.35* | 43.30* | 43.35 | 43.35 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.05* | 54.20* | 54.25* | 54.15* | 54.20* | 54.15 | 54.25* | 54.35* | 54.30* | 54.4* | 54.4* | 54.35* |
| $L_L$ INSERTION LOSS | | | db | 78 | 75 | 76 | 77.5 | 78.0 | 75 | 78 | 77 | 76 | 78 | 79 | 79.5 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.63 | 17.62 | 18.1 | 17.61 | 17.64 | 17.69 | 17.69 | 17.63 | 17.67 | 17.65 | 17.87 | 17.81 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.77 | 17.75 | 17.9 | 17.78 | 17.78 | 17.80 | 17.82 | 17.80 | 17.83 | 17.77 | 17.86 | 17.85 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 19.7 | 19.6 | 20.3 | 19.9 | 19.7 | 18.5 | 20.2 | 19.5 | 19.2 | 19.8 | 20 | 19.5 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-23-6 | 8-31-6 | 10-29-6 | 8-31-6 | 1-19-7 | 1-19-7 | 1-19-7 | 4-25-7 | 4-25-7 | 4-25-7 | 7-27-77 | 7-27-77 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | MSK | MSK | MSK | MSK | MSK | D.RJ | MSK | MSK | MSK | dal | DRJ | dal |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.

HUGHES **ELECTRON DYNAMICS DIVISION**
2100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 53,865 | 54651 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | | | | 9/29/77 | 11/1/77 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.0 | 2.04 | | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.81 | 3.81 | | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.08 | 4.08 | | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.78 | .62 | | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.83 | 2.77 | | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.25 | | | | | | | | | | | |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.5* | 54.3* | | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | 79 | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 17.7 | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 17.9 | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 20.2 | 19.4 | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-27-7 | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | | |
| TESTED BY | | | | msk | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES 1. END OF CONTRACT
* OUT OF SPEC

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-2
B200350-122

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME SPEC. NO.

HIGH LEVEL LIFE TEST PLAN & PROCEDURE LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(set); Freq $f_o$

INPUT CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 7/26/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF 11/5/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

INPUT CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF / /
WEEK OF / /
WEEK OF 9/30/?
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/?
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

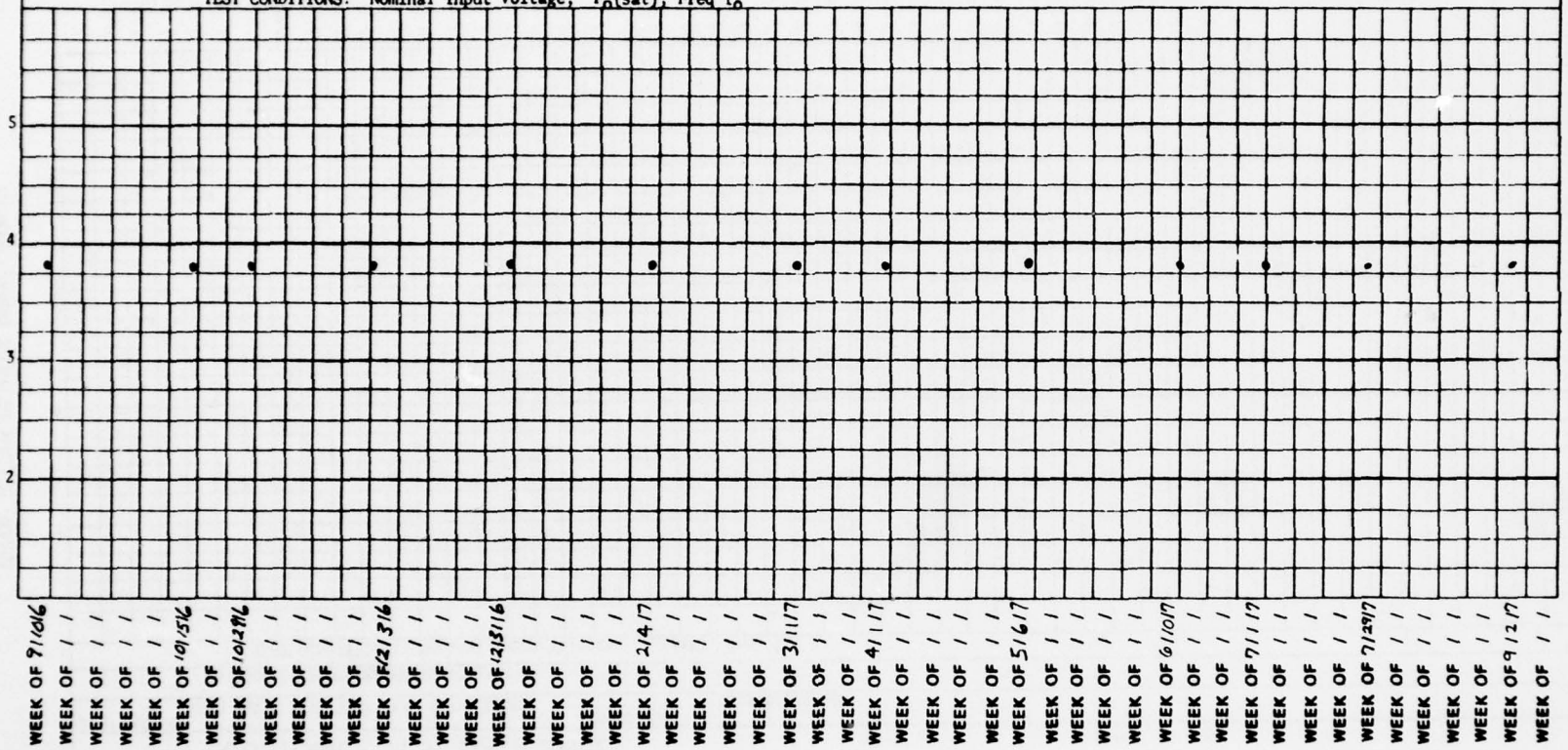
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION
2100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ___

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO.: LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 9/30/87
WEEK OF 11/4/87

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

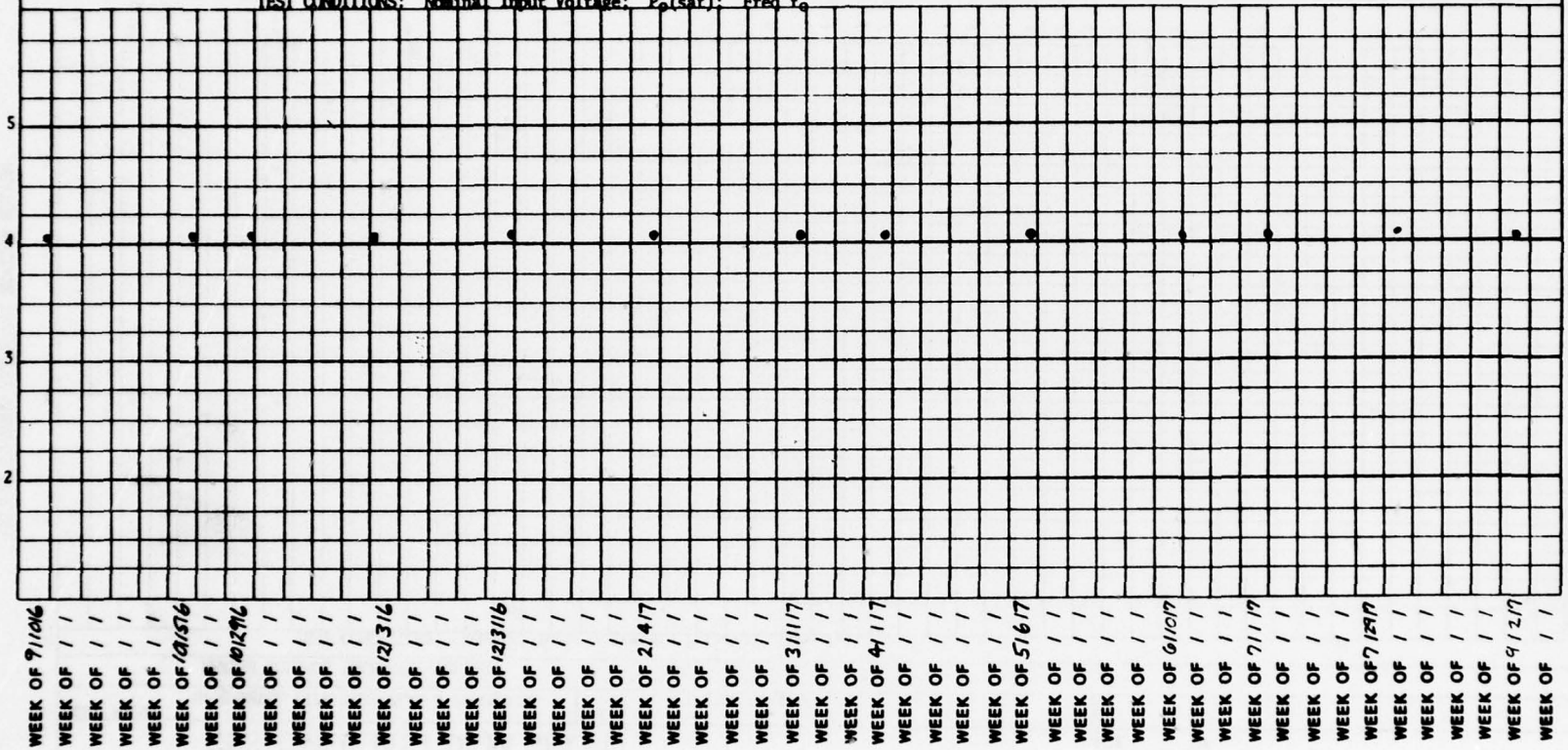
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$


HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)
5
4
3
2
WEEK OF 9/1/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 5/6/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

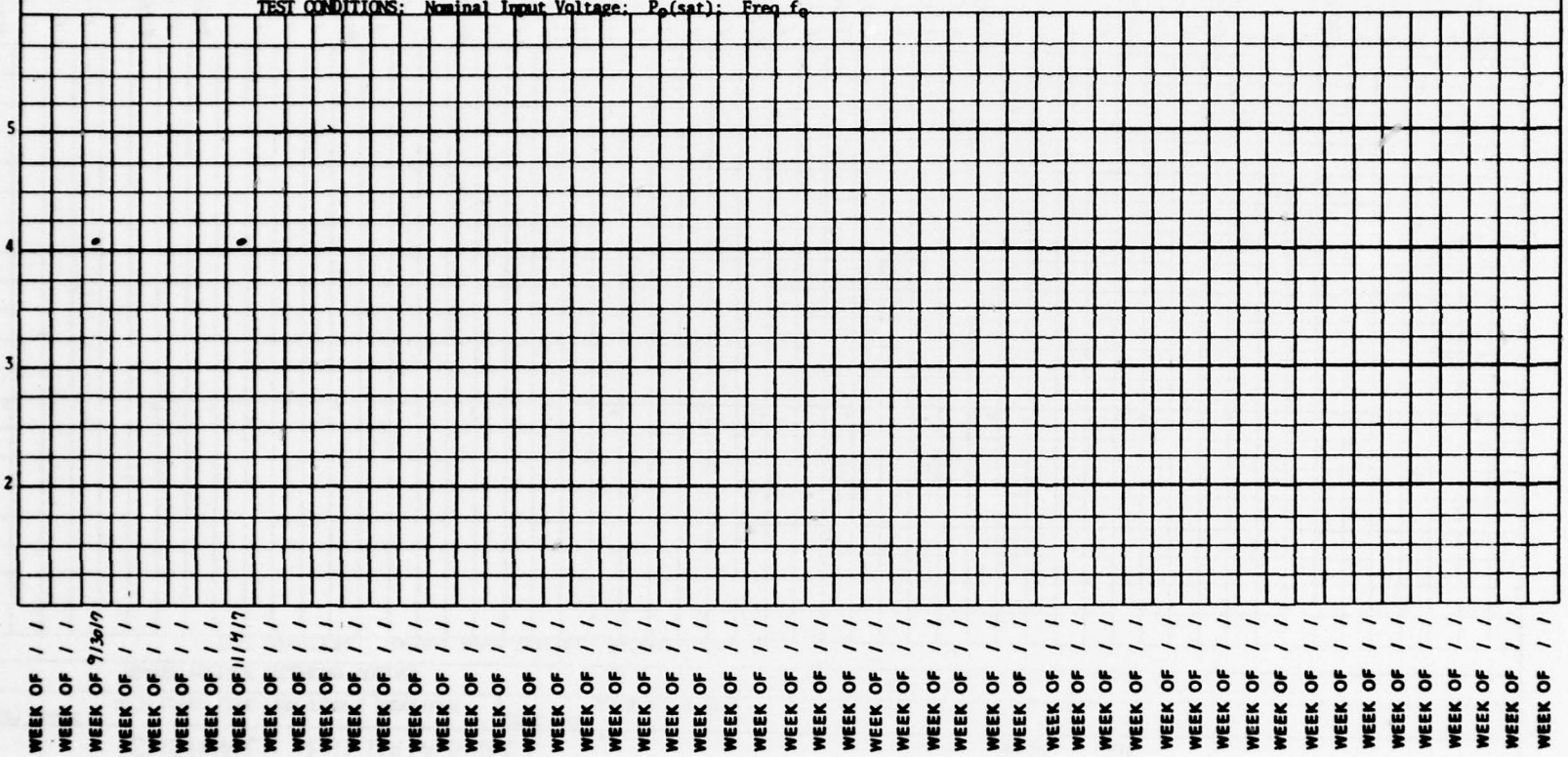
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. ~~BSB200350-400~~ B200350-121 REV. ____
MODEL NO. ~~B200350-122~~ SERIAL NO. 12-2

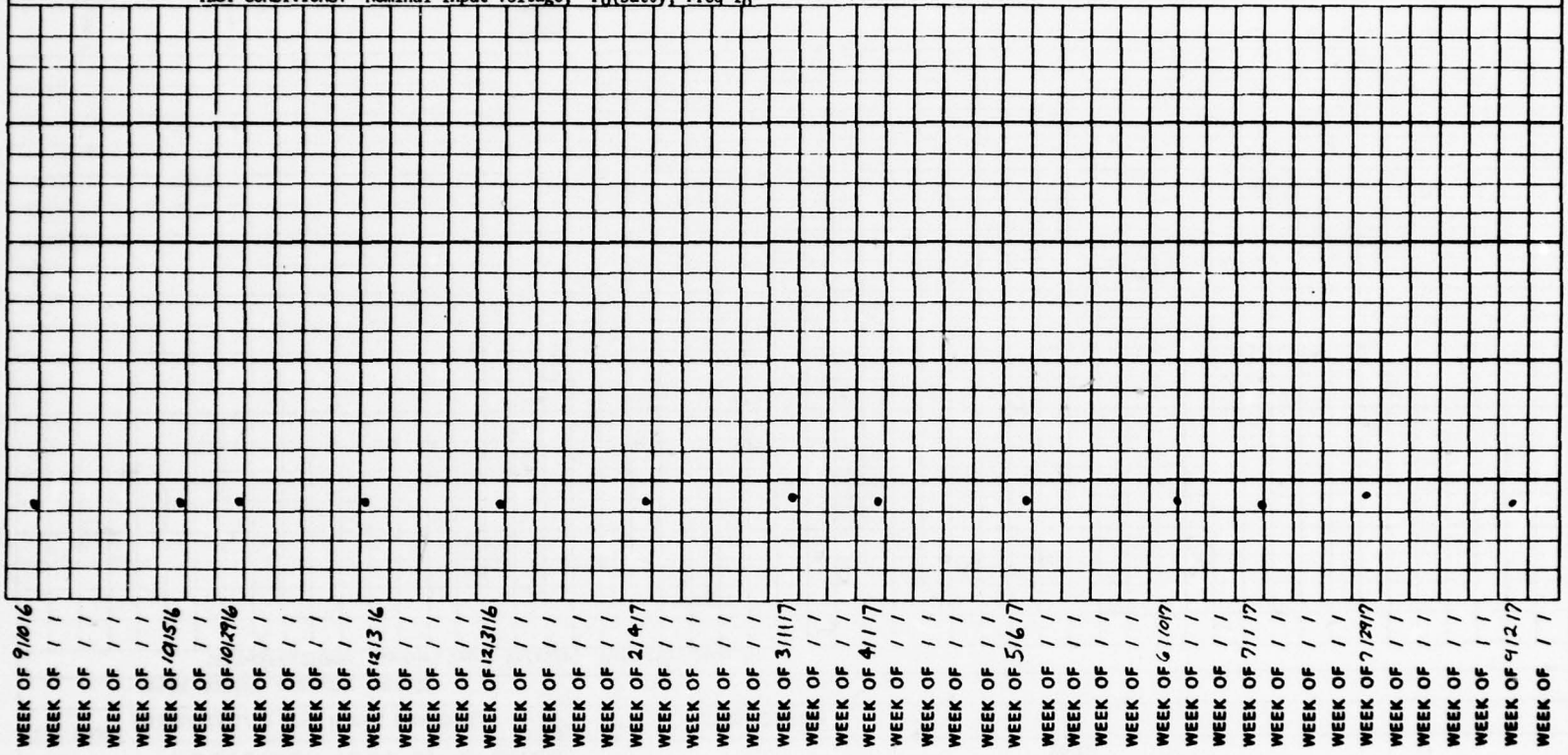
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. ~~DSB200350-400~~ B200350-121 REV. _____
MODEL NO. ~~B200350-122~~ SERIAL NO. 12-2

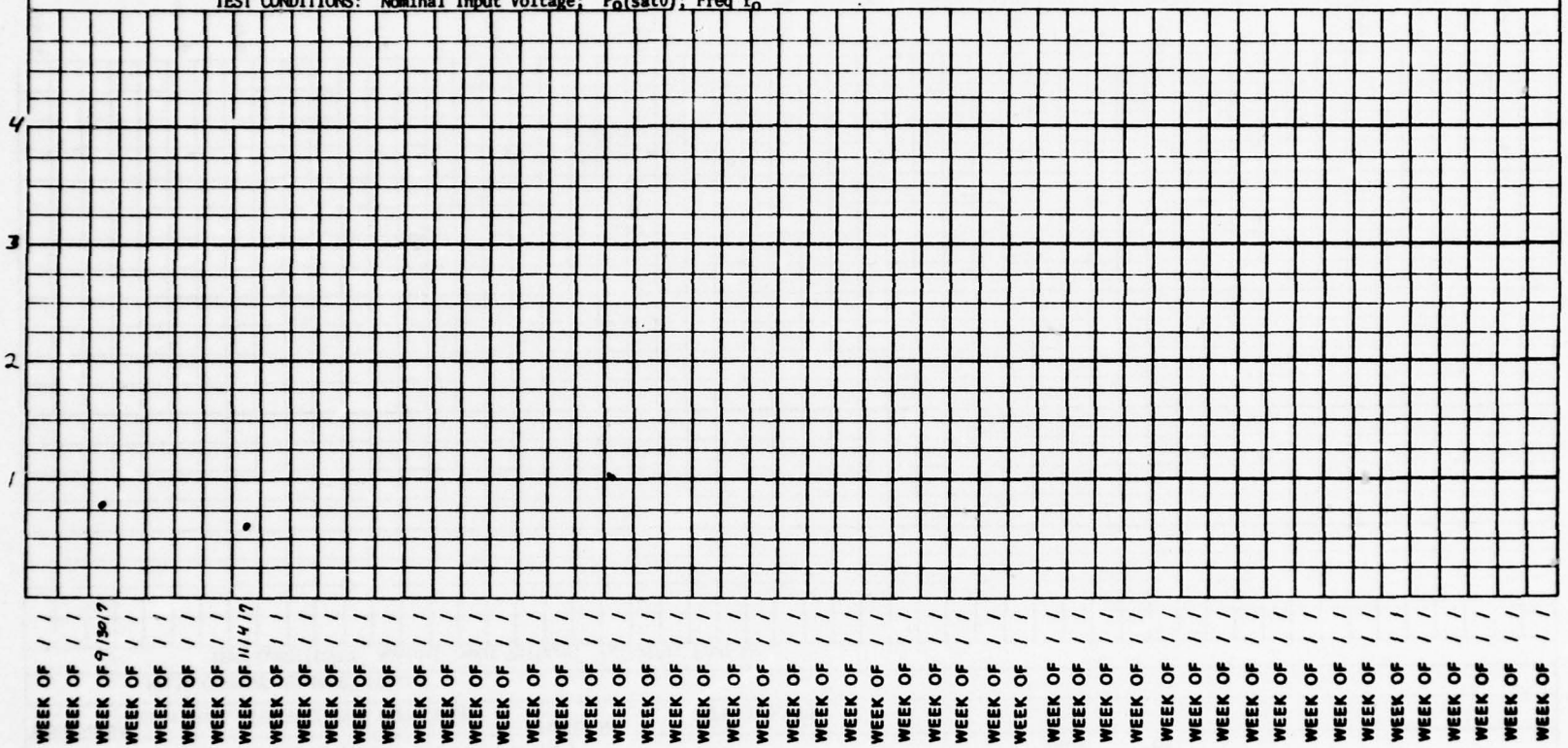
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_0$(sat0); Freq $f_0$


4
3
2
1
WEEK OF / /
WEEK OF / /
WEEK OF 9/30/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

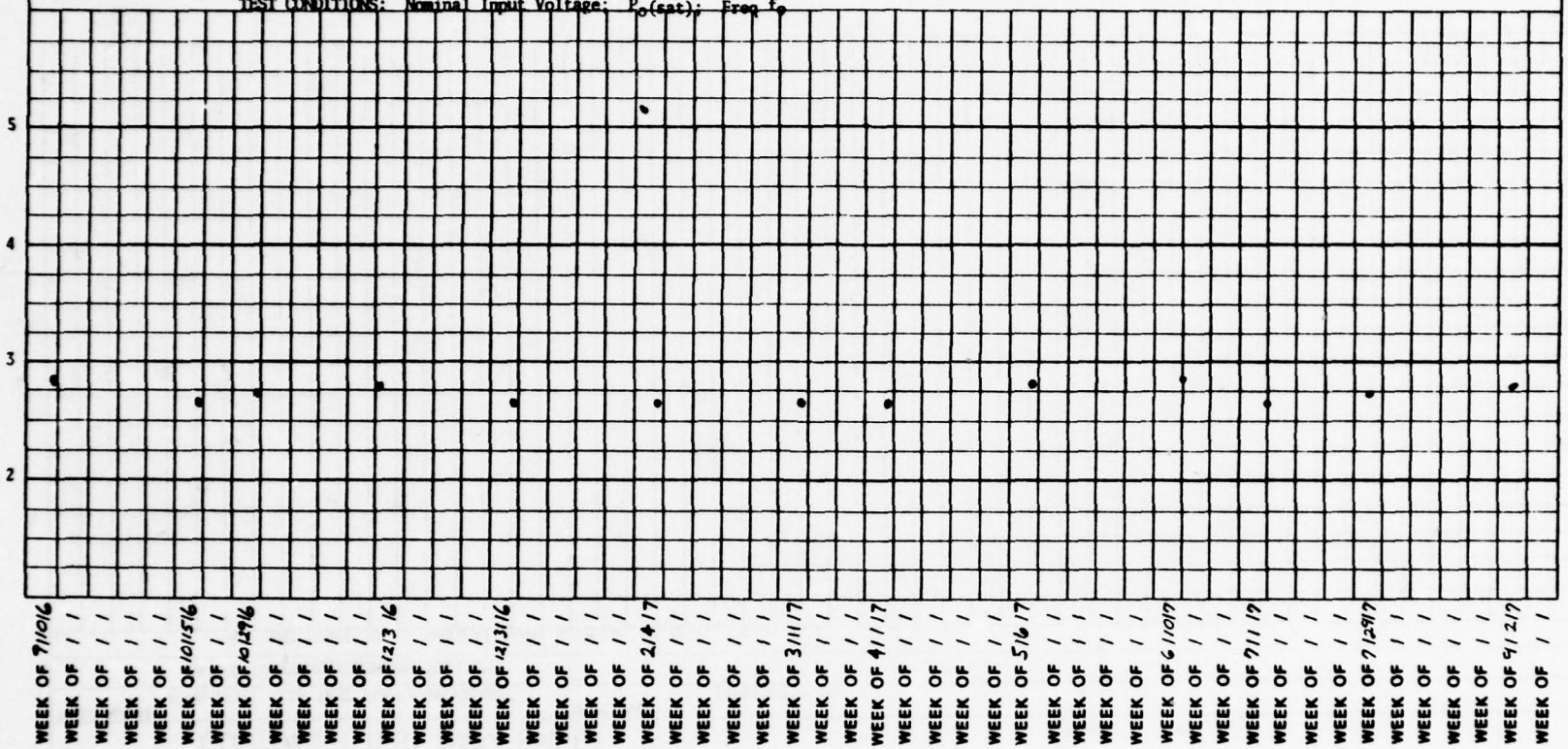
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___ ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF / /
WEEK OF / /
WEEK OF 9/347
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/417
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

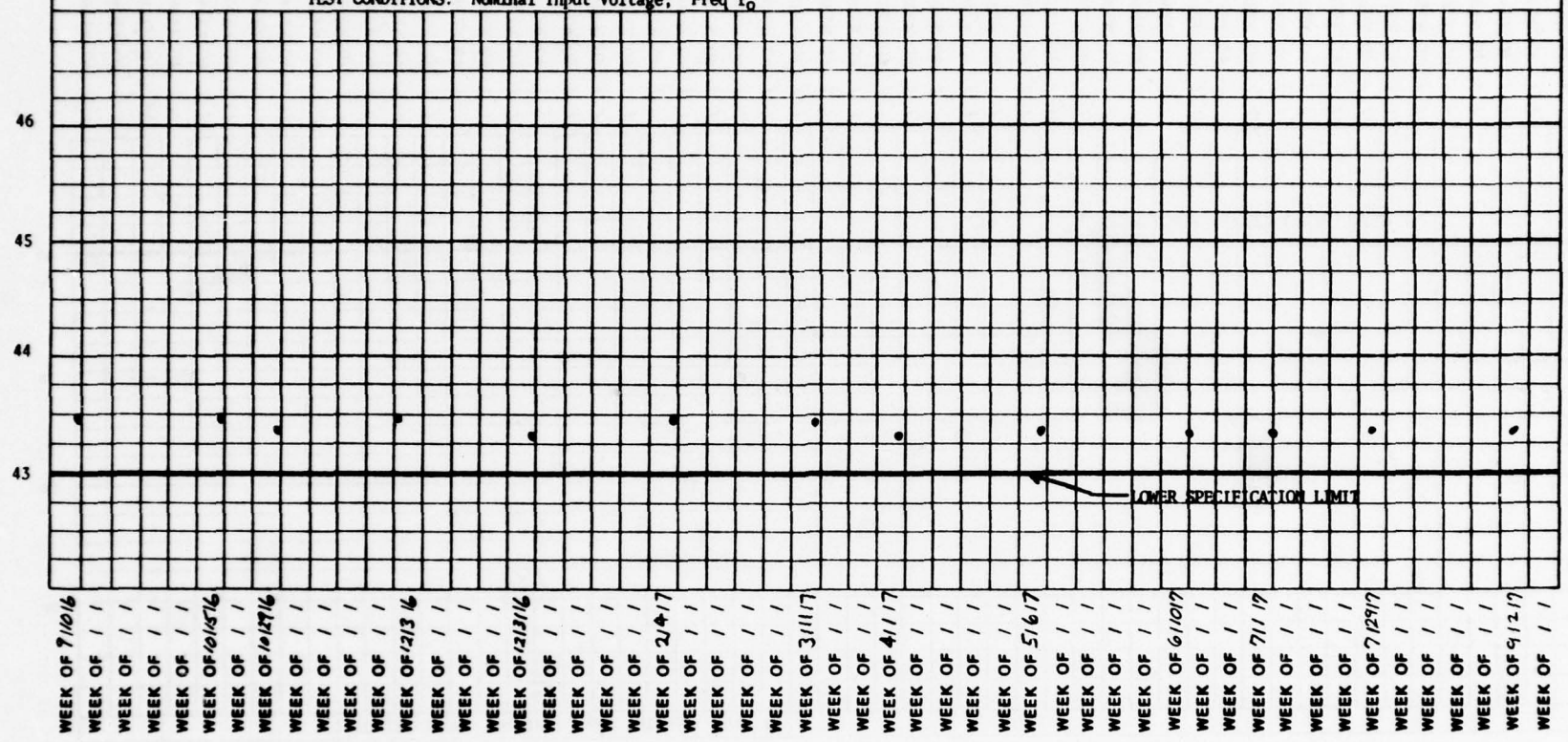
DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 ~~B200350-123~~ SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
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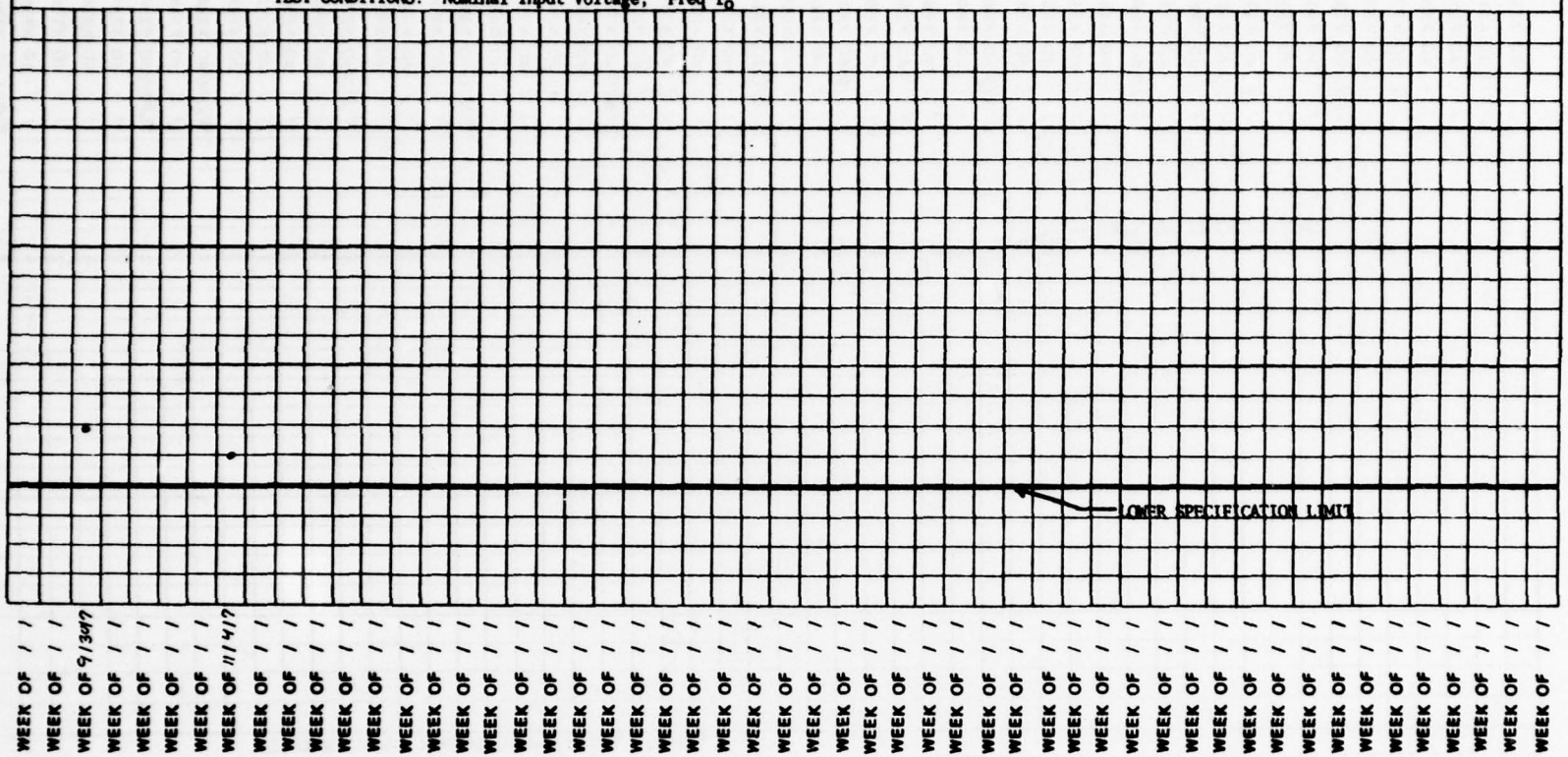
DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 12-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB 200350-400 REV. _____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

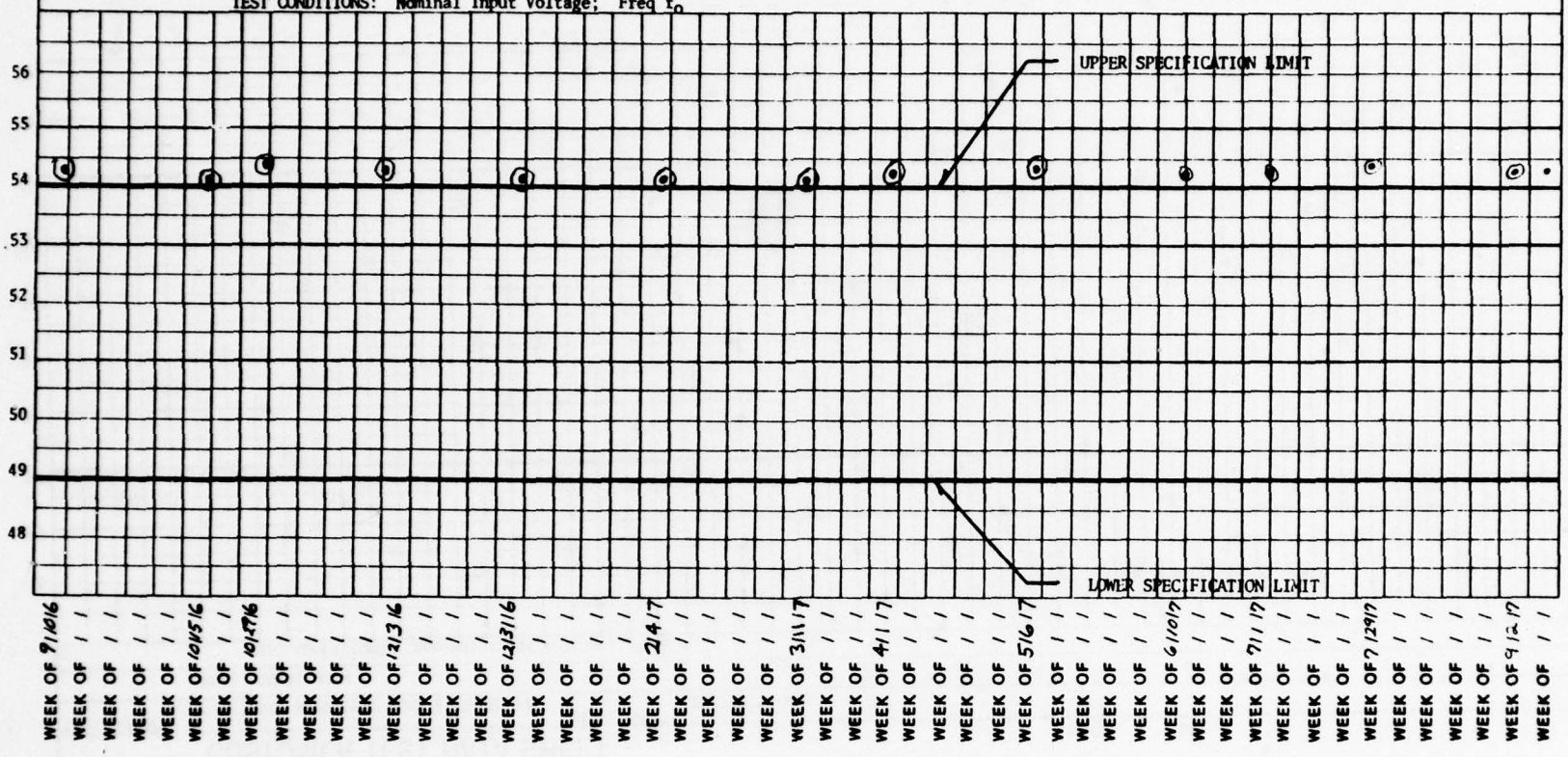
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ Out of Spec

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB 200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

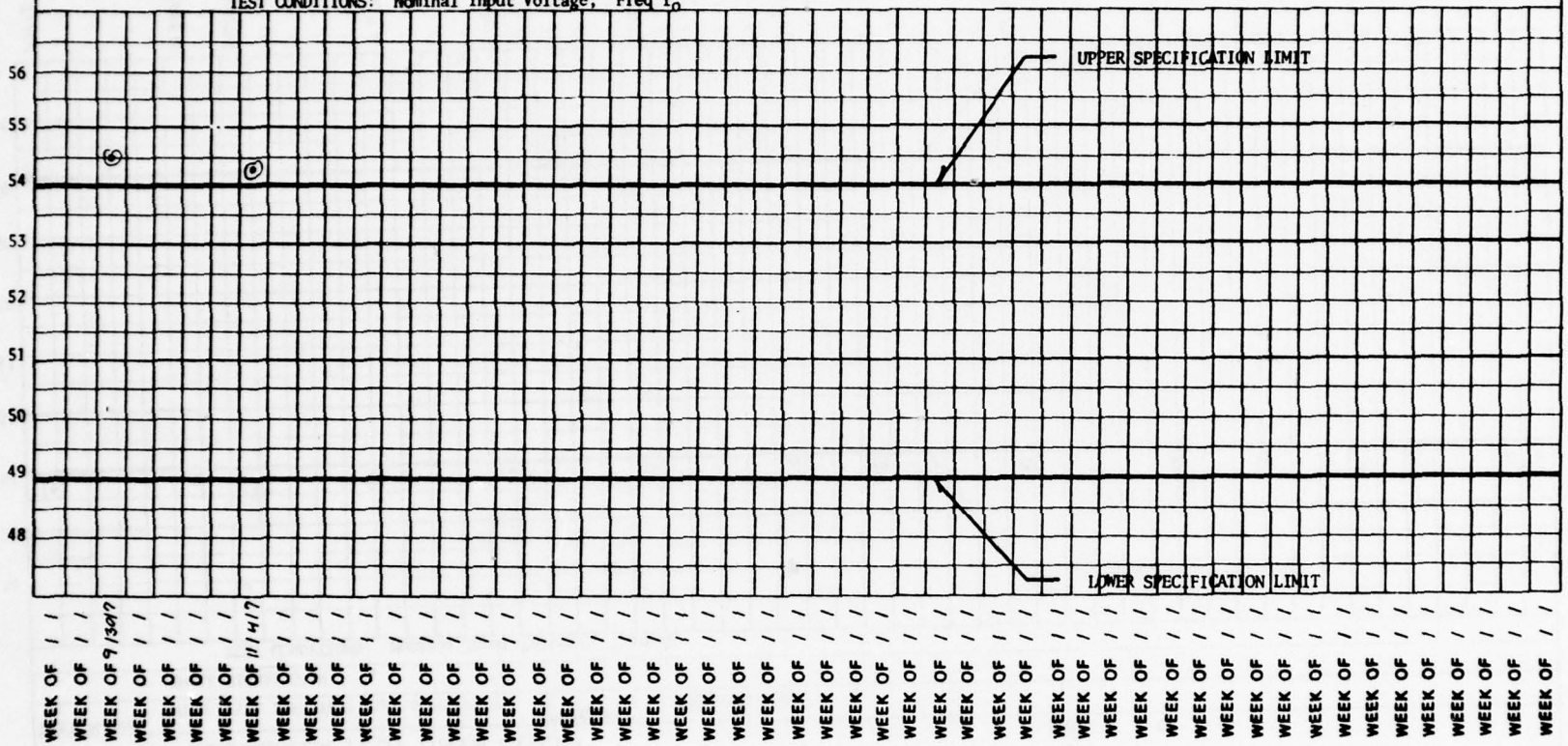
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




(⊙) OUT OF SPEC

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

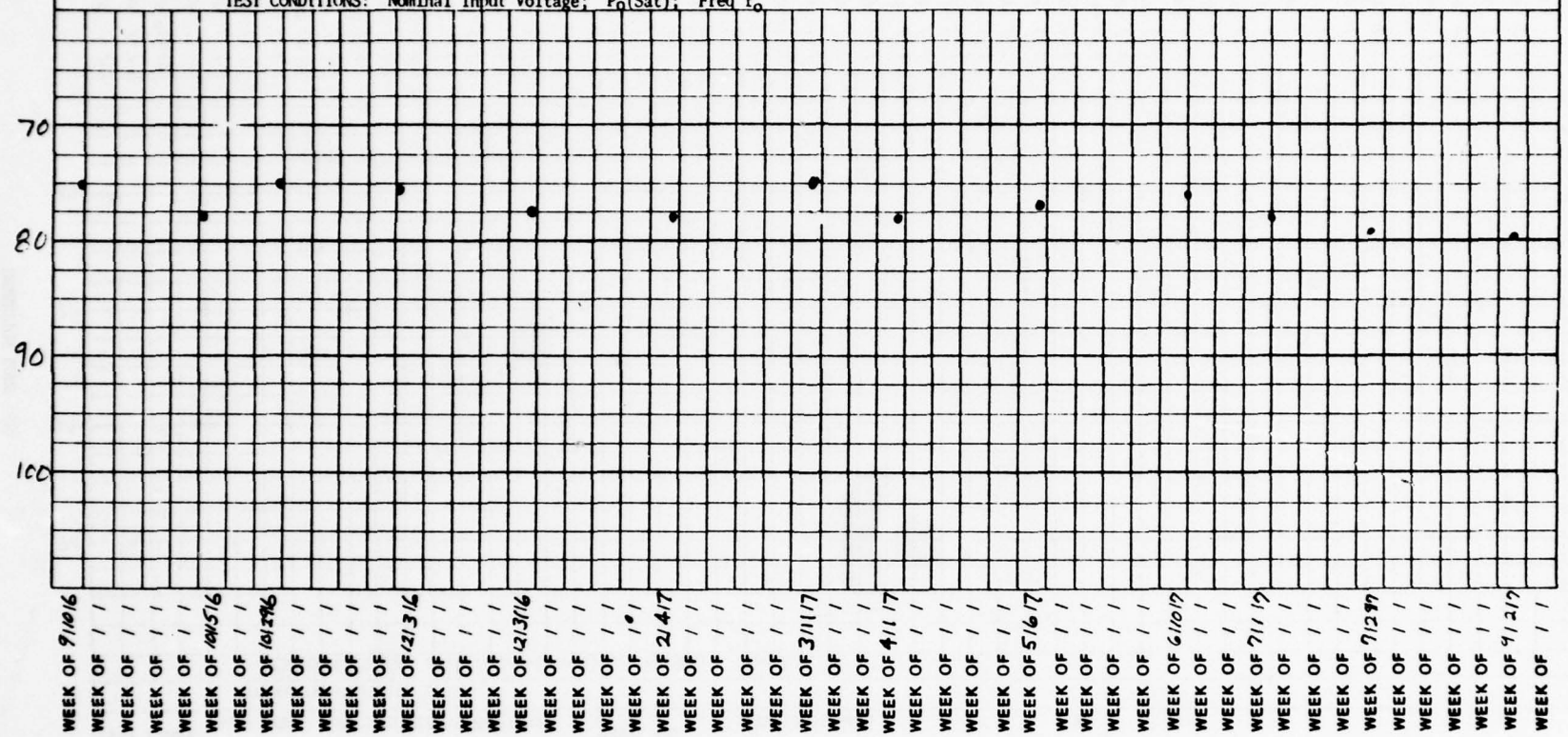
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_O$(Sat); Freq $f_o$



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DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

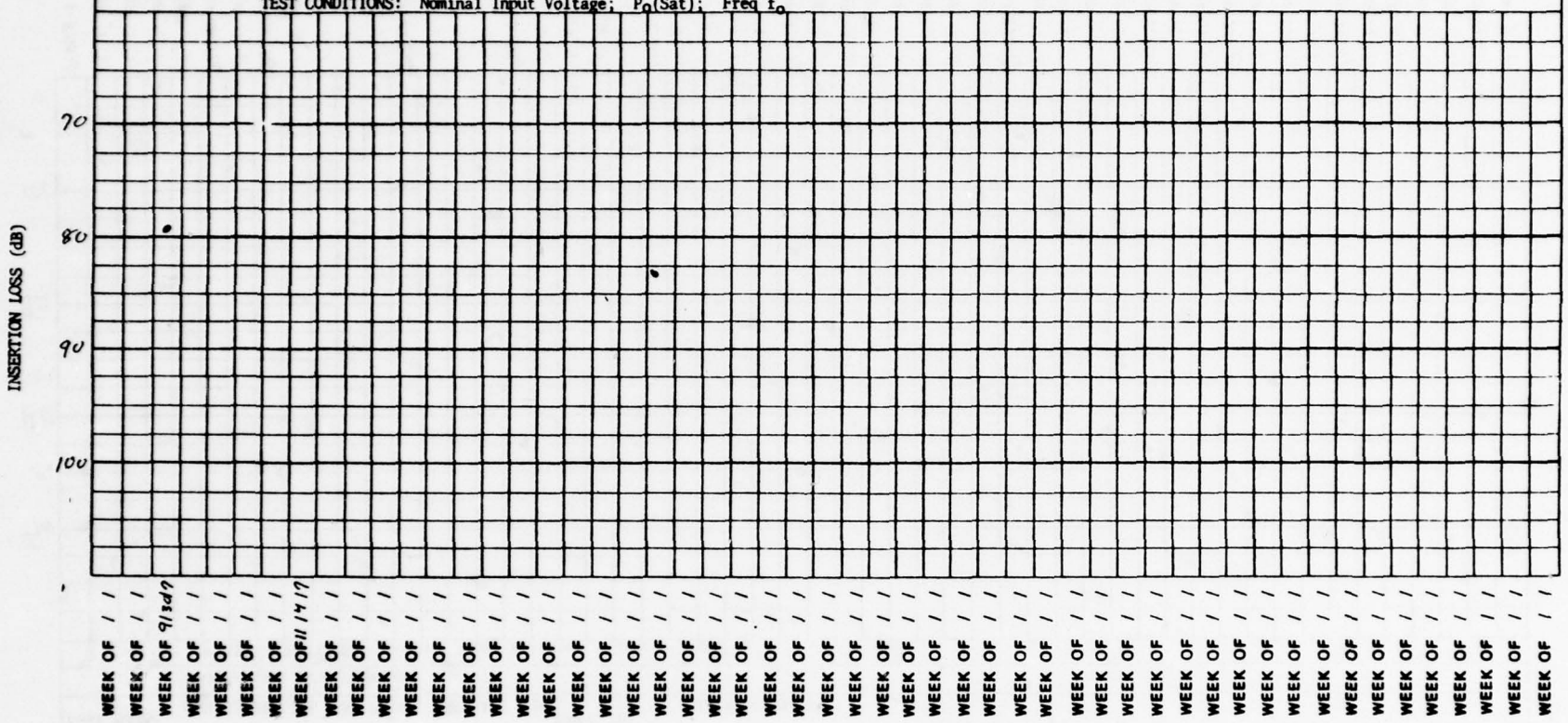
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

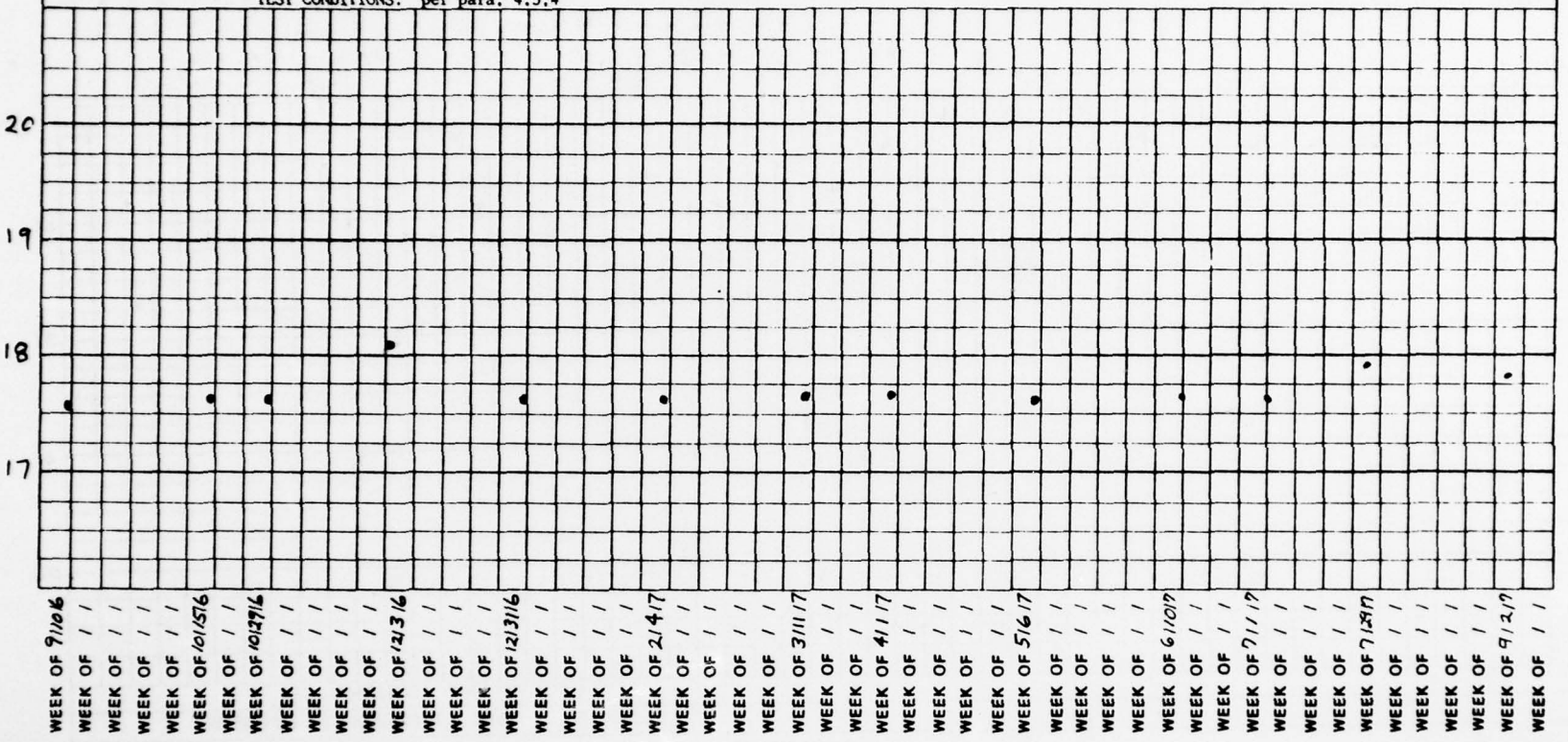
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4




ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

20
19
18
17

WEEK OF / /
WEEK OF / /
WEEK OF 9/30/7
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/7
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - OUTPUT (OHMS)

20
19
18
17

WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/3/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 5/6/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 6/10/17
WEEK OF / /
WEEK OF / /
WEEK OF 7/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 7/29/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/2/17
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-2

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - OUTPUT (OHMS)

D-80

20

19

18

17

WEEK OF / /

WEEK OF / /

WEEK OF 9/30?

WEEK OF / /

WEEK OF / /

WEEK OF / /

WEEK OF / /

WEEK OF 11/4/?

WEEK OF / /

WEEK OF / /

WEEK OF / /

WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. LSB200350-400 REV.
B200350-121
MODEL NO. B200350-122 SERIAL NO. 12-2

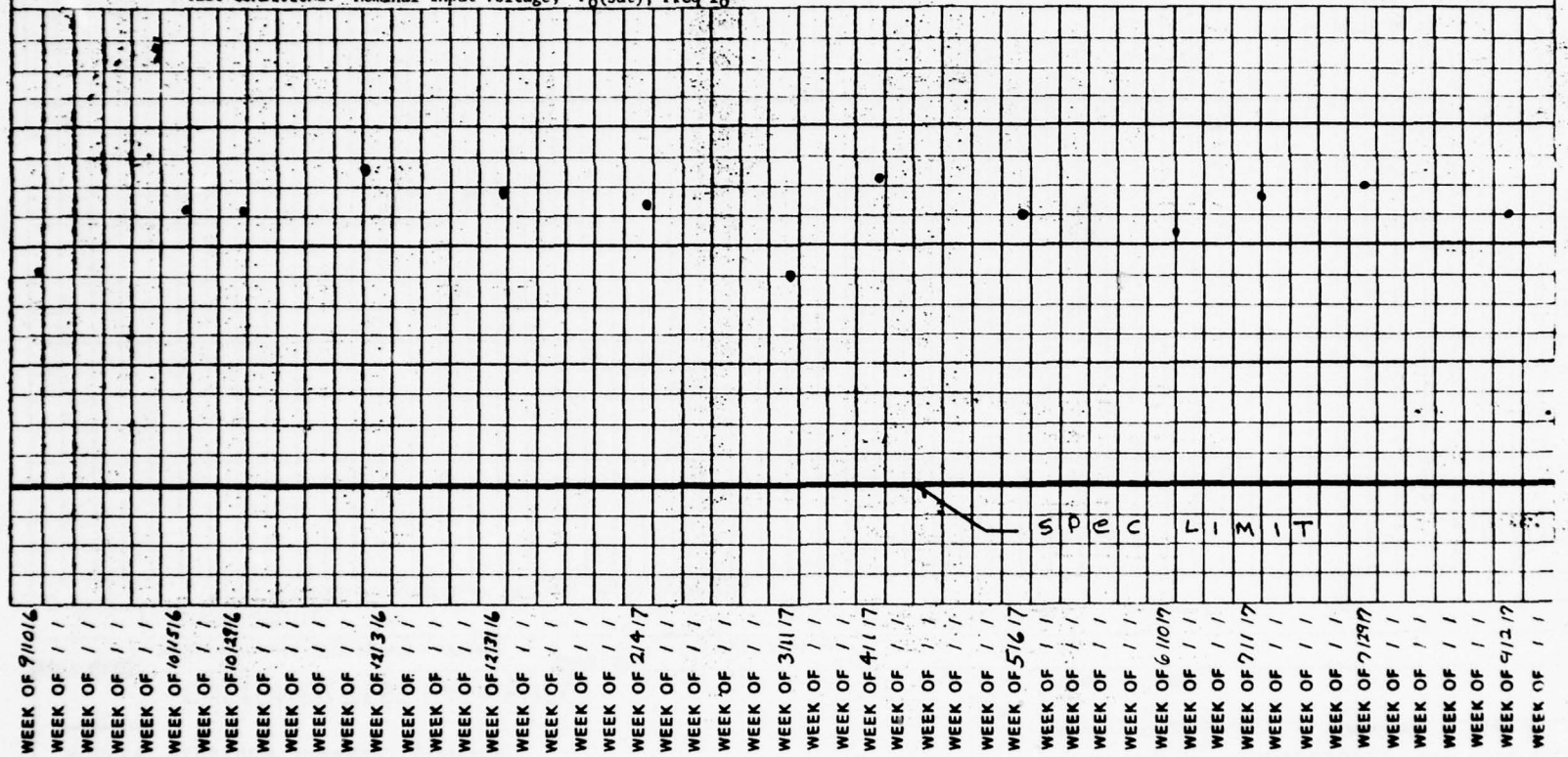
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV

MODEL NO. R200350-121 R200350-122 SERIAL NO. 12-2

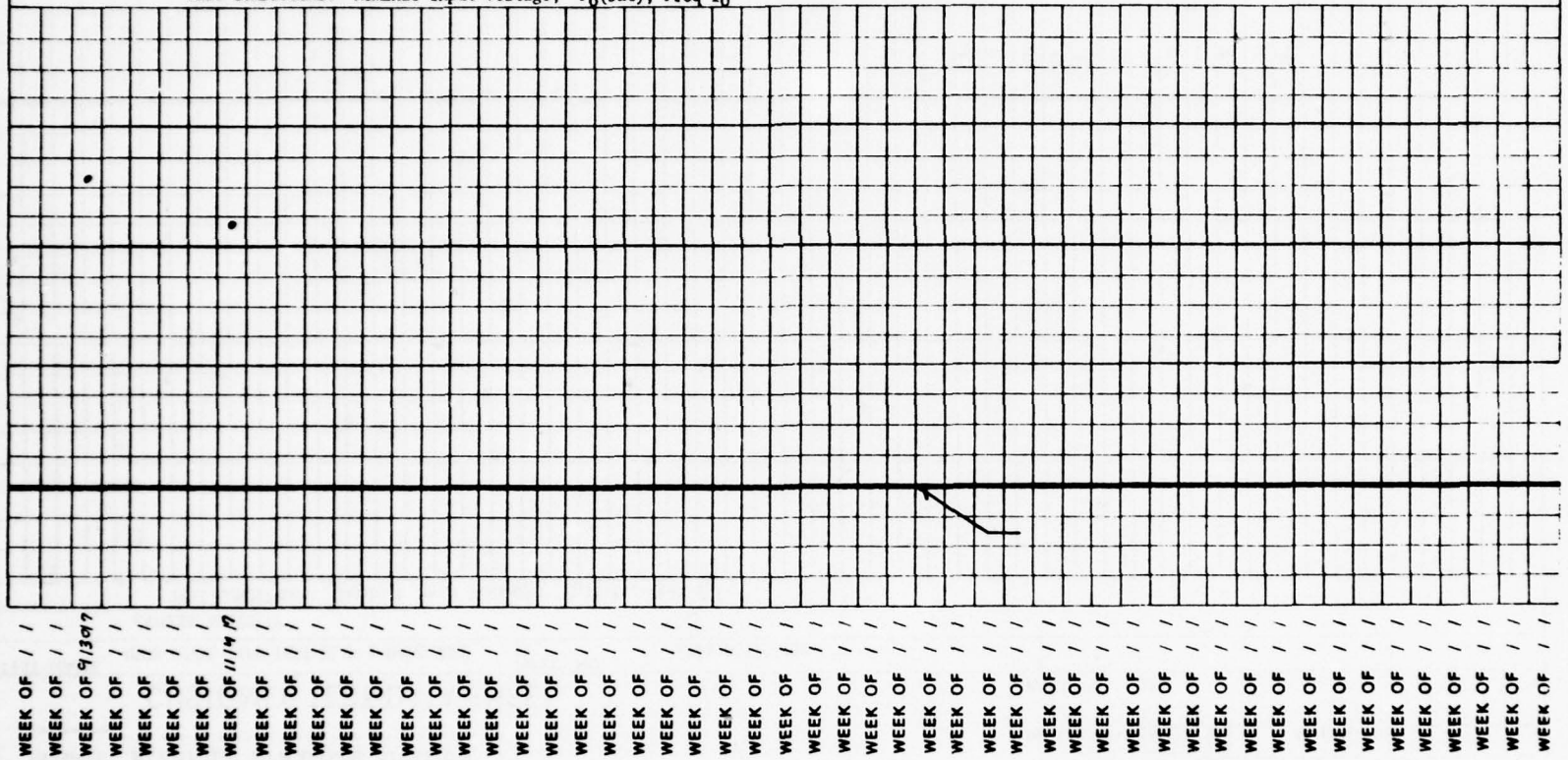
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO.: LTPB200350-400 | ACCEPTANCE TEST DATA

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$<br>TOTAL ACCUMULATED HOURS | | | | PRE FINAL | FINAL | 6,600 | 13,250 | 19,913 | 26,915 | 34,222 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 4/21/71 | 4/25/71 | 2/15/72 | 12/13/72 | 10/1/73 | 8/1/74 | 11/1/77 | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.831 | 1.826 | 1.841 | 1.818 | 1.821 | 1.818 | 1.809 | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.855 | 3.863 | 3.842 | 3.841 | 3.850 | 3.847 | 3.888 | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.064 | 4.059 | 4.066 | 4.055 | 4.059 | 4.054 | 4.046 | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.333 | 0.342 | 0.464 | 0.392 | 0.387 | 0.372 | 0.289 | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.611 | 2.706 | 2.675 | 2.744 | 2.710 | 2.700 | 2.789 | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.10 | 43.20 | 43.1 | 43.35 | 43.25 | 43.1 | 43.0 | | | | | |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.63 | 54.63* | 54.55 | 54.80 | 55.00 | 55.05 | 55.70 | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 14.5 | 14.4 | 13.6 | 14.3 | 14.3 | 14.6 | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. * DOES NOT MEET SPECIFICATION LIMIT. OUT OVER MAJOR PORTION OF LIFE.

TWT has 2708 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE

SPEC: LTPB 200350-400

SERIAL NO. 12-3



| SPEC. PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 19913 | 54222 | HOUR |
| 4.1 | CATHODE ACTIVITY, SECONDS | 15.0 | | 14.5 | 14.3 | 14.6 | |
| 4.2 | STABILITY | | | ✓ | ✓ | ✓ | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | ✓ | |
| 4.4 | INRUSH CURRENT | | | | | | |
| a) | INTEGRAL >Iss, t=5msec, ma-sec | | 30 | 15.0 | 13.0 | 11.0 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 1.5 | 1.6 | 1.8 | |
| c) | I >Iss PRIOR TO H.V., AMPS | | 15 | 3.8 | 5.0 | 4.4 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 14.9 | 16.0 | 11.0 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, sec | 60 | 120 | 89 | 90 | 89 | |
| f) | I >Iss, t=5msec AFTER H.V., AMPS | | .75 | 0.5 | 0.5 | 0 | |
| g) | I WITHIN ±3% Iss + >100msec | | | ✓ | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, VSWR | | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 1.47 | 1.41 | 1.32 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.28 | 1.17 | 1.18 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.20 | 1.07 | 1.22 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.20 | 1.07 | 1.28 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | | |
| | 1) INPUT CURRENT TLM V | | | 1.826 | 1.824 | 1.809 | |
| | 2) CATHODE CURRENT TLM V | | | 2.863 | 2.850 | 3.888 | |
| | 3) HEATER VOLTAGE TLM V | | | 4.059 | 4.059 | 4.046 | |
| | 4) HELIX CURRENT TLM V | | | 0.342 | 0.387 | .289 | |
| | 5) CATHODE VOLTAGE TLM V | | | 2.706 | 2.710 | 2.789 | |
| b) | $P_o$ (SAT.), dBm | 43 | | 43.2 | 43.25 | 43.0 | |
| c) | G (SAT.), dB | 45 | 48 | 47.5 | 48.35 | 48.8 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 19913 | DATA 54282 | HO |
|---|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.2 | 43.25 | 43.0 | |
| | 2) G (SAT.), dB | 45 | 48 | 47.5 | 48.35 | 48.8 | |
| | 3) I in , AMPS | | | 4.226 | 4.216 | 4.208 | |
| | 4) Pin (DC), WATTS | | 103 | 97.198 | 96.968 | 96.78 | |
| b) | Vin = 33 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.2 | 43.25 | 43.0 | |
| | 2) G (SAT.), dB | 45 | 48 | 47.5 | 48.35 | 48.8 | |
| | 3) I in , AMPS | | | 2.973 | 2.971 | 2.973 | |
| | 4) Pin (DC), WATTS | | 103 | 98.109 | 98.043 | 98.11 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.21 | ±0.15 | ±0.25 | |
| 4.9 | GAIN FLATNESS | | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | ✓ | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | | |
| a) | Gss , dB | 49 | 54 | 54.63 | 55.0 | 55.7 | |
| b) | G (Var), dB | | ±0.35 | ±0.05 | ±0.10 | ±0.10 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 54.63 | 55.0 | 55.7 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.05 | ±0.10 | ±0.10 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 54.63 | 55.0 | 55.7 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.05 | ±0.10 | ±0.10 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.003 | 0.004 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.006 | 0.007 | 0.0068 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.001 | 0.007 | 0.0026 | |
| b) | Vin = 28 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.003 | 0.004 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.006 | 0.007 | 0.0068 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.001 | 0.007 | 0.0026 | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.003 | 0.004 | 0.005 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.006 | 0.007 | 0.0068 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.001 | 0.007 | 0.0026 | |
| 4.12 | NOISE FIGURE | | | | | | |
| a) | N.F., dB | | 33 | 28.2 | 28.0 | 26.5 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 19913 | DATA 54222 | HOUR |
|---|---|---|---|---|---|---|---|
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.5 | 10.8 | 9.4 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 21.6 | 23.0 | 22.0 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 29.5 | 30.0 | 30.2 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 31.8/30 | 27/30 | 28/30 | |
| 4.15 | AM/PM CONVERSION | | | | | | |
| | $\frac{\Delta \phi}{\Delta Pi(rf)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.3 | 1.3 | 1.4 | |
| b) | at 0dB | | 3.5 | 1.3 | 1.3 | 1.5 | |
| c) | at -2dB | | 3.5 | 1.6 | 1.5 | 1.6 | |
| d) | at -3dB | | 3.5 | 1.7 | 1.7 | 1.7 | |
| e) | at -4dB | | 3.5 | 1.8 | 1.8 | 1.9 | |
| f) | at -5dB | | 3.5 | 2.0 | 2.0 | 2.0 | |
| g) | at -6dB | | 3.5 | 2.0 | 2.2 | 2.2 | |
| h) | at -7dB | | 3.5 | 1.9 | 2.2 | 2.4 | |
| i) | at -8dB | | 3.5 | 1.7 | 1.9 | 2.3 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHz LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.01 | .0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | ✓ | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 16.0 | 13.0 | 13.65 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 324 | 674 | 1058 | 1254 | 1477 | 1712 | 1875 | 1989 | 2129 | 2318 | 2482 | 2767 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of | week of | week of | week of | week of | week of | week of | week of | week of | week of | week of | week of |
| | | | | 5/23/71 | 6/8/71 | 6/24/71 | 7/2/71 | 7/14/71 | 7/24/71 | 7/31/71 | 8/5/71 | 8/11/71 | 8/19/71 | 8/26/71 | 9/7/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.910 | 1.820 | 1.821 | 1.816 | 1.818 | 1.809 | 1.853 | 1.805 | 1.837 | 1.849 | 1.832 | 1.852 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.851 | 3.857 | 3.856 | 3.851 | 3.852 | 3.850 | 3.855 | 3.853 | 3.858 | 3.856 | 3.855 | 3.851 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.050 | 4.058 | 4.057 | 4.051 | 4.056 | 4.048 | 4.054 | .047 | 4.063 | 4.067 | 4.062 | 4.051 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .500 | .359 | .377 | .351 | .366 | .374 | .3762 | .361 | .404 | .420 | .410 | .379 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.715 | 2.726 | 2.731 | 2.731 | 2.742 | 2.807 | 2.764 | 2.820 | 2.674 | 2.642 | 2.696 | 2.791 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.32 | 43.35 | 43.30 | 43.40 | 43.30 | 43.35 | 43.20 | 43.35 | 43.38 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.28* | 54.38 | 54.30 | 54.36 | 54.25 | 54.28 | 54.48 | 54.46 | 54.43 | 54.40 | 54.40 | 54.23 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 14.4* | | 14.3* | | | | | | 14.0* | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | 7/2/71 | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
*DOES NOT MEET SPECIFICATION LIMITS

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-402

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 2817 | 2960 | 3133 | 3319 | 3459 | 3632 | 3794 | 3943 | 4130 | 4302 | 4492 | 4612 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 9/10/71 | week of 9/16/71 | week of 9/23/71 | week of 10/1/71 | week of 10/7/71 | week of 10/14/71 | week of 10/21/71 | week of 10/27/71 | week of 11/4/71 | week of 11/11/71 | week of 11/19/71 | week of 11/24/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.831 | 1.837 | 1.873 | 1.837 | 1.836 | 1.835 | 1.843 | 1.873 | 1.836 | 1.861 | 1.870 | 1.809 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.856 | 3.855 | 3.858 | 3.851 | 3.853 | 3.854 | 3.855 | 3.858 | 3.851 | 3.853 | 3.850 | 3.848 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.060 | 4.059 | 4.072 | 4.063 | 4.059 | 4.062 | 4.064 | 4.078 | 4.061 | 4.071 | 4.068 | 4.050 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .406 | .414 | .443 | .410 | .421 | .429 | .435 | .467 | .447 | .460 | .471 | .407 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.717 | 2.737 | 2.604 | 2.678 | 2.651 | 2.708 | 2.681 | 2.570 | 2.680 | 2.623 | 2.655 | 2.830 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.30 | 43.25 | 43.25 | 43.15 | 43.20 | 43.20 | 43.15 | 43.15 | 43.20 |
| $G_{ss}$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 54.28 | 54.21 | 54.20 | 54.30 | 54.31 | 54.19 | 54.20 | 54.17 | 54.13 | 54.20 | 54.00 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 11/2/71 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-402

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 4780 week of 12/1/71 | 4991 week of 12/10/71 | 5140 week of 12/16/71 | 5228 week of 12/22/71 | 5420 week of 12/30/71 | 5588 week of 1/6/72 | 5751 week of 1/13/72 | 5946 week of 1/21/72 | 6091 week of 1/27/72 | 6284 week of 2/4/72 | 6422 week of 2/10/72 | 6570 week of 2/17/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.837 | 1.841 | 1.840 | 1.840 | 1.847 | 1.841 | 1.853 | 1.85 | 1.84 | 1.84 | 1.84 | 1.84 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.853 | 3.851 | 3.851 | 3.850 | 3.848 | 3.850 | 3.852 | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.063 | 4.060 | 4.065 | 4.060 | 4.066 | 4.061 | 4.068 | 4.06 | 4.07 | 4.06 | 4.07 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .440 | .430 | .431 | .433 | .463 | .433 | .468 | .46 | .44 | .45 | .45 | .45 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.700 | 2.691 | 2.679 | 2.688 | 2.671 | 2.677 | 2.660 | 2.66 | 2.68 | 2.68 | 2.68 | 2.68 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.15 | 43.25 | 43.25 | 43.30 | 43.35 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.00 | 54.40 | 54.30 | 53.80 | 53.80 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | 14.3* |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 1/24/72 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES *DOES NOT MEET SPECIFICATION LIMITS

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-129 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 6739 week of 2/24/72 | 6900 week of 3/3/72 | 7053 week of 3/9/72 | 7245 week of 3/17/72 | 7380 week of 3/23/72 | 7548 week of 3/30/72 | 7671 week of 4/7/72 | 7910 week of 4/21/72 | 8055 week of 4/27/72 | 8251 week of 5/5/72 | 8413 week of 5/12/72 | 8586 week of 5/18/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.86 | 1.84 | 1.85 | 1.86 | 1.82 | 1.85 | 1.82 | 1.86 | 1.83 | 1.82 | 1.82 | 1.83 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.86 | 3.85 | 3.85 | 3.85 | 3.84 | 3.85 | 3.84 | 3.85 | 3.85 | 3.84 | 3.85 | 3.85 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.075 | 4.07 | 4.07 | 4.07 | 4.06 | 4.07 | 4.05 | 4.06 | 4.06 | 4.05 | 4.06 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .47 | .45 | .45 | .46 | .42 | .45 | .39 | .47 | .42 | .40 | .41 | .46 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.60 | 2.68 | 2.66 | 2.66 | 2.74 | 2.67 | 2.70 | 2.66 | 2.70 | 2.70 | 2.73 | 2.72 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.35 | 43.35 | 43.30 | 43.30 | 43.30 |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.40 | 54.40 | 54.80 | 54.70 | 54.65 | 54.70 | 54.70 | 54.60 | 54.60 | 54.50 | 54.70 | 54.60 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | 4/19/72 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 8749 | 8917 | 9088 | 9251 | 9423 | 9591 | 9758 | 9924 | 10051 | 10214 | 10379 | 10545 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/26/72 | week of 6/2/72 | week of 6/9/72 | week of 6/16/72 | week of 6/23/72 | week of 6/30/72 | week of 7/7/72 | week of 7/14/72 | week of 7/21/72 | week of 7/28/72 | week of 8/4/72 | week of 8/11/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | 1.83 | 1.81 | 1.82 | 1.82 | 1.81 | 1.82 | 1.84 | 1.82 | 1.79 | 1.82 | 1.82 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.83 | 3.84 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.06 | 4.05 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .399 | .396 | .39 | .38 | .40 | .41 | .40 | .40 | .41 | .367 | .39 | .40 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.76 | 2.71 | 2.75 | 2.74 | 2.73 | 2.74 | 2.74 | 2.65 | 2.71 | 2.83 | 2.75 | 2.71 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.35 | 43.45 | 43.40 | 43.35 | 43.40 | 43.40 | 43.35 | 43.35 | 43.40 | 43.35 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.70 | 54.75 | 54.80 | 54.70 | 54.70 | 54.70 | 54.70 | 54.60 | 54.70 | 54.80 | 54.80 | 54.80 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 10706 week of 8/18/72 | 10850 week of 8/28/72 | 10921 week of 8/31/72 | 10998 week of 9/8/72 | 11159 week of 9/15/72 | 11324 week of 9/22/72 | 11494 week of 9/29/72 | 11656 week of 10/6/72 | 11821 week of 10/13/72 | 11986 week of 10/20/72 | 12160 week of 10/27/72 | 12322 week of 11/3/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.83 | 1.83 | 1.83 | 1.82 | 1.82 | 1.83 | 1.83 | 1.80 | 1.80 | 1.82 | 1.81 | 1.82 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.84 | 3.83 | 3.84 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 | 4.06 | 4.05 | 4.05 | 4.06 | 4.06 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .40 | .40 | .41 | .39 | .39 | .40 | .40 | .37 | .37 | .40 | .38 | .41 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.69 | 2.71 | 2.69 | 2.70 | 2.74 | 2.73 | 2.69 | 2.76 | 2.74 | 2.71 | 2.71 | 2.69 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.40 | 43.40 | 43.35 | 43.40 | 43.35 | 43.40 | 43.35 | 43.35 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.80 | 54.80 | 54.70 | 54.70 | 54.80 | 54.70 | 54.80 | 54.60 | 54.80 | 54.60 | 54.70 | 54.70 |
| $I_L$ INSERTION LOSS | | | db | | | 64.90 | | | 64.90 | | | 67.40 | | | 67.50 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 20.50 | | | 20.55 | | | 20.58 | | | 20.60 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 20.69 | | | 20.71 | | | 20.72 | | | 20.77 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | 9/7/72 | | | 9/29/72 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 12482 week of 11/10/72 | 12650 week of 11/17/72 | 12763 week of 11/22/72 | 12976 week of 12/1/72 | 13138 week of 12/8/72 | 13282 week of 12/15/72 | 13420 week of 12/21/72 | 13496 week of 12/29/72 | 13664 week of 1/5/73 | 13828 week of 1/12/73 | 13991 week of 1/19/73 | 14231 week of 1/29/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | 1.82 | 1.80 | 1.82 | 1.81 | 1.82 | 1.81 | 1.83 | 1.81 | 1.84 | 1.82 | 1.81 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.84 | 3.84 | 3.83 | 3.84 | 3.84 | 3.84 | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 | 3.84 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.05 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.07 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .39 | .40 | .41 | .37 | .39 | .39 | .377 | .385 | .38 | .41 | .37 | .38 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.71 | 2.68 | 2.71 | 2.74 | 2.69 | 2.73 | 2.74 | 2.73 | 2.73 | 2.65 | 2.76 | 2.73 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dBm | 43.20 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.35 | 43.30 | 43.30 | 43.15 | 43.30 | 43.30 |
| $G_o$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.80 | 54.70 | 54.80 | 54.70 | 54.70 | 54.70 | 54.60 | 54.80 | 54.70 | 54.60 | 56.40 | 54.60 |
| $L_I$ INSERTION LOSS | | | db | | | 66.50 | | | 66.40 | | | 66.20 | | | 64.40 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 20.66 | | | 20.65 | | | 20.68 | | | 20.70 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 20.70 | | | 20.80 | | | 20.85 | | | 20.87 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | 16.0 | 13.60 | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 1/12/73 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 14326 week of 2/2/73 | 14488 week of 2/9/73 | 14658 week of 2/16/73 | 14819 week of 2/23/73 | 14991 week of 3/2/73 | 15155 week of 3/9/73 | 15325 week of 3/16/73 | 15486 week of 3/23/73 | 15650 week of 3/30/73 | 15818 week of 4/6/73 | 15981 week of 4/13/73 | 16149 week of 4/20/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.83 | 1.81 | 1.83 | 1.82 | 1.82 | 1.83 | 1.82 | 1.83 | 1.83 | 1.80 | 1.83 | 1.81 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.85 | 3.85 | 3.86 | 3.84 | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 | 3.85 | 3.86 | 3.86 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.06 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .39 | .38 | .39 | .38 | .37 | .38 | .38 | .39 | .39 | .37 | .38 | .37 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.69 | 2.70 | 2.74 | 2.70 | 2.74 | 2.70 | 2.71 | 2.68 | 2.71 | 2.77 | 2.74 | 2.76 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.10 | 43.30 | 43.20 | 43.30 | 43.20 | 43.25 | 43.25 | 43.25 | 43.30 | 43.30 | 43.35 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.80 | 54.70 | 54.80 | 54.60 | 54.80 | 54.80 | 54.80 | 54.80 | 54.80 | 54.80 | 55.20 | 55.30 |
| $L_L$ INSERTION LOSS | | | db | | | 76.20 | | | | | | 64.20 | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 20.75 | | | | | | 20.73 | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 20.90 | | | | | | 20.90 | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 14.40 | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 4/4/73 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 16294 week of 4/27/73 | 16461 week of 5/4/73 | 16629 week of 5/11/73 | 16800 week of 5/18/73 | 16961 week of 5/25/73 | 17131 week of 6/1/73 | 17301 week of 6/9/73 | 17443 week of 6/15/73 | 17612 week of 6/22/73 | 17753 week of 6/29/73 | 17919 week of 7/6/73 | 18087 week of 7/13/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | 1.82 | 1.83 | 1.86 | 1.83 | 1.84 | 1.82 | 1.82 | 1.82 | 1.81 | 1.81 | 1.81 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.86 | 3.86 | 3.86 | 3.85 | 3.86 | 3.86 | 3.85 | 3.86 | 3.86 | 3.85 | 3.86 | 3.86 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.06 | 4.06 | 4.07 | 4.06 | 4.06 | 4.06 | 4.06 | 4.06 | 4.05 | 4.05 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .37 | .33 | .39 | .45 | .40 | .41 | .39 | .38 | .38 | .37 | .37 | .37 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.75 | 2.71 | 2.72 | 2.59 | 2.71 | 2.68 | 2.73 | 2.73 | 2.73 | 2.76 | 2.78 | 2.83 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.35 | 43.35 | 43.35 | 43.30 | 43.35 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 55.30 | 55.10 | 55.20 | 55.20 | 55.20 | 55.20 | 55.20 | 55.20 | 55.20 | 55.20 | 55.10 | 55.00 |
| $I_L$ INSERTION LOSS | | | db | | | 64.50 | | | | | | 63.90 | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 20.82 | | | | | | 20.80 | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 21.00 | | | | | | 21.00 | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS: 18400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | week of 7/26/73 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.86 | | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .38 | | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.73 | | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | | | | | | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 55.10 | | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AMI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 19,086 | 19,838 | 20,520 | 21,194 | 21,819 | 22,600 | 23,238 | 23,861 | 24,469 | 25,157 | 25,818 | 26,485 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/73 | 9/28/73 | 10/26/73 | 11/30/73 | 12/28/73 | 1/31/74 | 2/28/74 | 4/1/74 | 4/29/74 | 5/28/74 | 6/26/74 | 7/26/74 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | 1.81 | 1.80 | 1.80 | 1.80 | 1.80 | 1.82 | 1.81 | 1.85 | 1.80 | 1.84 | 1.79 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.86 | 3.85 | 3.81 | 3.83 | 3.83 | 3.83 | 3.84 | 3.83 | 3.86 | 3.83 | 3.86 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.06 | 4.05 | 4.04 | 4.05 | 4.04 | 4.05 | 4.05 | 4.05 | 4.04 | 4.05 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .37 | .38 | .37 | .34 | .37 | .36 | .39 | .41 | .49 | .33 | .46 | .34 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.82 | 2.73 | 2.77 | 2.80 | 2.72 | 2.75 | 2.68 | 2.75 | 2.74 | 2.77 | 2.75 | 2.72 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.25 | 43.35 | 43.40 | 43.35 | 43.30 | 43.40 | 43.40 | 43.30 | 43.30 | 43.15 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 55.1# | 55.1# | 55.2# | 55.2# | 55.2# | 55.2# | 55.2# | 55.2# | 55.1# | 55.2# | 55.2# | 55.2# |
| $L_L$ INSERTION LOSS | | | db | 64.3 | 64.0 | 64.4 | 63.8 | 64.2 | 64.1 | 64.3 | 64.2 | 63.90 | 63.80 | 63.50 | 63.60 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 20.85 | 20.85 | 21.0 | 20.99 | 20.99 | 20.98 | 20.99 | 21.04 | 21.07 | 21.09 | 21.09 | 21.11 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 21.02 | 21.1 | 21.1 | 21.13 | 21.12 | 21.15 | 21.16 | 21.20 | 21.20 | 21.22 | 21.23 | 21.24 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 13.9# | 15.0 | * | | 14.5# | 14.3# | 14.8# | 14.5# | 15.5 | 14.0# | 14.5# | 14.5# |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8/10/73 | 8/10/73 | 8/10/73 | 8/10/73 | 11/28/73 | 11/28/73 | 11/28/73 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

*RECORDER OUT FOR REPAIR

# DOES NOT MEET SPECIFICATION LIMITS

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS | 27,267 | 27,968 | 28739 | 29451 | 30,052 | 30,839 | 31,440 | 32,070 | 32,829 | 33,602 | 34,253 | 34,987 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 8/30/74 | 9/30/74 | 11/1/14 | 12/2/14 | 12/27/14 | 1/29/15 | 2/26/15 | 3/28/15 | 4/28/15 | 5/31/15 | 7/1/75 | 8/12/15 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 1.834 | 1.789 | 1.81 | 1.800 | 1.83 | 1.83 | 1.80 | 1.81 | 1.79 | 1.81 | 1.79 | 1.77 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.827 | 3.829 | 3.833 | 3.844 | 3.85 | 3.85 | 3.85 | 3.84 | 3.86 | 3.85 | 3.82 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.061 | 4.046 | 4.05 | 4.04 | 4.05 | 4.04 | 4.04 | 4.04 | 4.04 | 4.05 | 4.05 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .379 | 317 | .35 | .312 | .362 | .334 | .31 | .34 | .31 | .32 | .32 | .30 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.586 | 2.72 | 2.66 | 2.744 | 2.66 | 2.65 | 2.72 | 2.63 | 2.71 | 2.68 | 2.68 | 2.71 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.3 | 43.3 | 43.3 | 43.3 | 43.35 | 43.3 | 43.3 | 43.2 | 43.4 | 43.4 | 43.35 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 55.1* | 55.1* | 55.1* | 55.1* | 55.1* | 55.1* | 55.1* | 55.0* | 55.2* | 55.3* | 55.2* | 55.2* |
| $I_L$ INSERTION LOSS | | | db | | 63.4 | 63.1 | 63.8 | 62.8 | 63.3 | 64.5 | 63.0 | 63.6 | 63.8 | 63.0 | 62.6 | 62.8 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 21.10 | 21.12 | 21.12 | 21.17 | 21.18 | 21.20 | 21.27 | 21.20 | 21.21 | 21.25 | 21.28 | 21.30 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 21.25 | 21.29 | 21.29 | 21.32 | 21.40 | 21.25 | 21.36 | 21.36 | 21.36 | 21.40 | 21.40 | 21.43 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 14.5* | 13.8* | ~~14.4~~ 14.6* | 14.6* | 15.0 | 15.0 | 14.0* | 14.7* | 14.2* | 14.8* | 14.1* | 14.0* |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-24-4 | 7-24-4 | 7-24-4 | 11-21-4 | 11-21-4 | 11-21-4 | 1-31-5 | 1-31-5 | 1-31-5 | 4-1-5 | 4-1-5 | 7-30-5 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | W.P.N | WPN | WPN | WPN | W.P.N | WPN | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | WPN |

SIGNIFICANT EVENT NOTES
* OUT OF SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200356-121 B200356-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ | | | | TOTAL ACCUMULATED HOURS | 35,758 | 36,500 | 37166 | 37,936 | 38,874 | 39,375 | 40,181 | 40,999 | 41,533 | 42208 | 43,007 | 44433 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | | 91215 | 101415 | 111115 | 121315 | 11316 | 21316 | 31216 | 41516 | 41916 | 61116 | 61916 | 91816 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 1.82 | 1.79 | 1.78 | 1.80 | 1.80 | 1.82 | 1.81 | 1.80 | 1.79 | 1.82 | 1.80 | 1.78 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.83 | 3.81 | 3.83 | 3.84 | 3.81 | 3.83 | 3.88 | 3.87 | 3.85 | 3.86 | 3.85 | 3.83 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.06 | 4.06 | 4.04 | 4.05 | 4.06 | 4.06 | 4.05 | 4.05 | 4.05 | 4.05 | 4.05 | 4.05 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .35 | .31 | .30 | .31 | .31 | .34 | .30 | .29 | .31 | .31 | .32 | .30 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.57 | 2.63 | 2.71 | 2.62 | 2.57 | 2.54 | 2.65 | 2.72 | 2.64 | 2.72 | 2.68 | 2.67 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.30 | 43.4 | 43.35 | 43.30 | 43.35 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 55.2* | 55.0* | 55.2* | 55.1* | 55.1* | 55.1 | 55.0 | 55.15* | 55.25* | 55.25* | 55.30* | 55.30 |
| $I_L$ INSERTION LOSS | | | db | | 64.0 | 63.3 | 63.0 | 63.8 | 63.3 | 63.3 | 63.0 | 63.2 | 62 | 61 | 64 | 62.6 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 21.40 | 21.50 | 21.45 | 21.39 | 21.45 | 21.51 | 21.45 | 21.46 | 21.46 | 21.51 | 21.44 | 21.52 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 21.46 | 21.46 | 21.48 | 21.49 | 21.47 | 21.51 | 21.55 | 21.56 | 21.58 | 21.6 | 21.55 | 21.60 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 14.0* | 13.5* | 14.0* | 13.9* | 14.0* | 14.2* | 14.0* | 14.2* | 14.5* | 14.3* | 14.7* | 14.2 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-30-5 | 7-30-5 | 10-29-5 | 10-29-5 | 10-29-5 | 2-3-6 | 2-3-6 | 2-3-6 | 2-3-6 | 5-7-6 | 5-12-6 | 7-23-6 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | WPN | W.P.N | WPN | W.P.N | W.P.N | W.P.N | MSK | MSK | MSK | W.P.N | MSK | W.P.N |

SIGNIFICANT EVENT NOTES
* out of specification limit

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS | 45,411 | 46,242 | 46,543 | 47,244 | 47,984 | 48700 | 49,231 | 49882 | 50,720 | 51252.7 | 51961 | 52701 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10/13/76 | 10/27/76 | 11/29/76 | 12/29/76 | 2/2/77 | 3/10/77 | 3/28/77 | 5/2/77 | 6/16/77 | 6/29/77 | 7/29/77 | 8/29/77 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 1.817 | 1.780 | 1.990 | 2.00 | 1.795 1.994 | 1.757 | 1.781 | 1.802 | 1.777 | 1.83 | 1.805 | 1.81 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.882 | 3.845 | 3.852 | 3.862 | 3.860 | 3.880 | 3.851 | 3.861 | 3.822 | 3.87 | 3.886 | 3.868 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.057 | 4.047 | 4.060 | 4.062 | 4.050 | 4.055 | 4.050 | 4.058 | 4.059 | 4.065 | 4.046 | 4.059 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .321 | .281 | .309 | .342 | .320 | .317 | .301 | .324 | .294 | .339 | .301 | .300 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.69 | 2.76 | 2.658 | 2.648 | 2.654 | 2.712 | 2.735 | 2.63 | 2.636 | 2.600 | 2.765 | 2.64 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.30 | 43.35 | 43.35 | 43.30 | 43.35 | 43.40 | 43.35 | 43.40 | 43.40 | 43.32 | 43.4 | 43.45 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 55.25* | 55.30* | 55.25* | 55.35* | 55.25* | 55.35* | 55.45* | 55.45* | 55.45* | 55.45* | 55.85* | 55.85* |
| $I_L$ INSERTION LOSS | | | db | | 64.5 | 63.1 | 62.8 | 64.5 | 64.0 | 65 | 63 | 64 | 63 | 64 | 63.50 | 64.50 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 21.55 | 21.53 | 21.5 | 21.54 | 21.59 | 21.68 | 21.65 | 21.69 | 21.69 | 21.74 | 21.72 | 21.75 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 21.60 | 21.67 | 21.7 | 21.71 | 21.75 | 21.76 | 21.79 | 21.76 | 21.79 | 21.80 | 21.87 | 21.90 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 14.2* | 14.2* | 14.2* | 14.5* | 14.2* | 13.7* | 14.2* | 14.5* | 14.4* | 14.4* | 14.4* | 14.4* |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-23-6 | 8-31-6 | 10-19-6 | 8-31-6 | 1-19-7 | 1-19-7 | 1-20-7 | 5-2-7 | 4-25-7 | 4-25-77 | 7-29-7 | 7-27-77 8-29-77 8-22 9-20-77 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | — | | | | | | |
| TESTED BY | | | | | MSK | MSK | MSK | MSK | MSK | D R J | MSK | D.R.J. | MSK | ALL | | ALL |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.

HUGHES ELECTRON DYNAMICS DIVISION
2100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 53,436 | 54222 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 9 4th | 11/12/77 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 1.81 | 1.809 | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.87 | 3.888 | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.05 | 4.046 | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .302 | .289 | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.73 | 2.737 | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.0 | | | | | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.85* | 55.7 | | | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | 63 | | | | | | | | | | | |
| $R_{AIR}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 21.76 | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 21.91 | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 14.3* | 14.6* | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-27-77 | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | JSK | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.
1. END OF CONTRACT

D-101

HUGHES ELECTRON DYNAMICS DIVISION
6100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

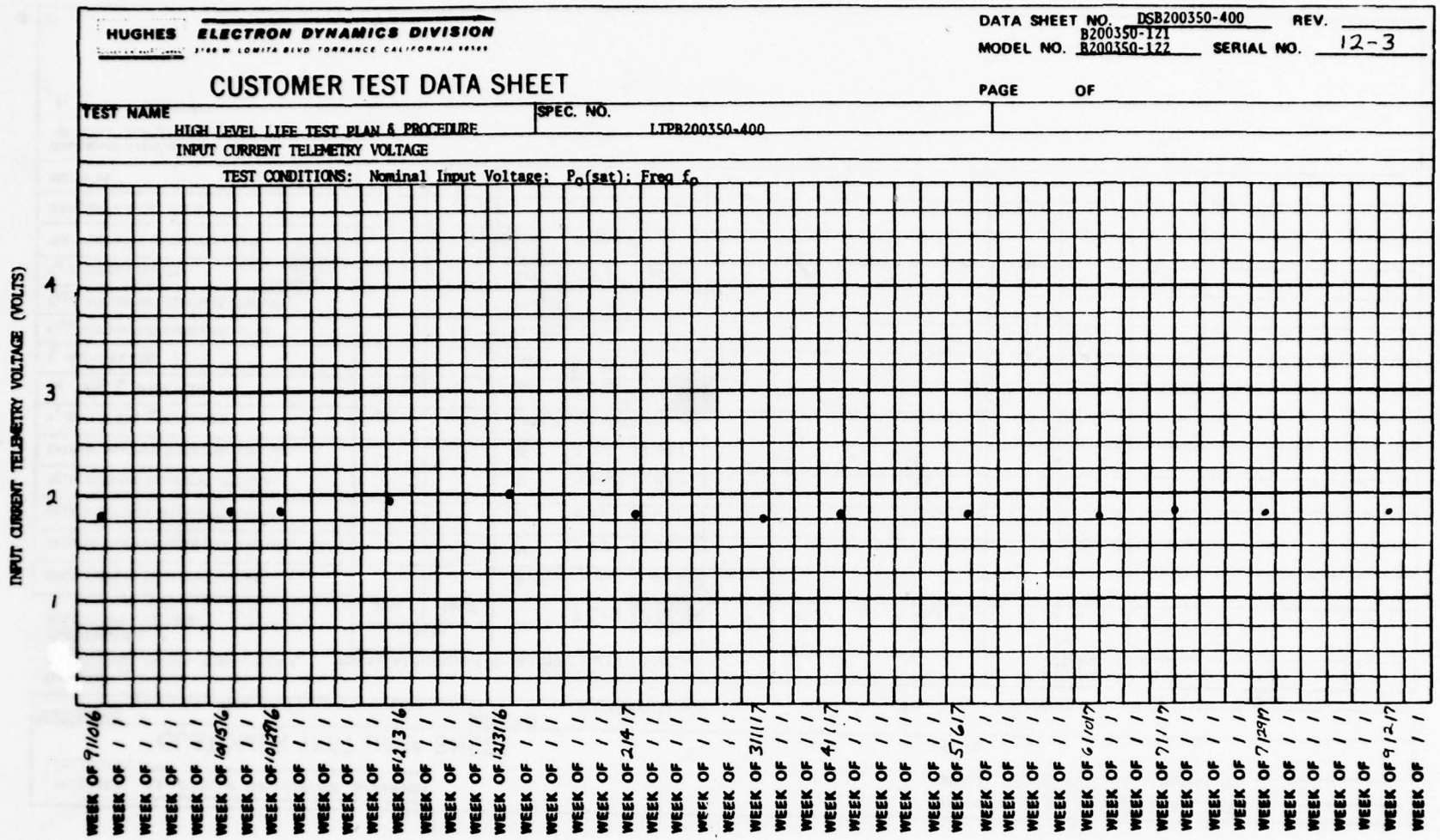
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

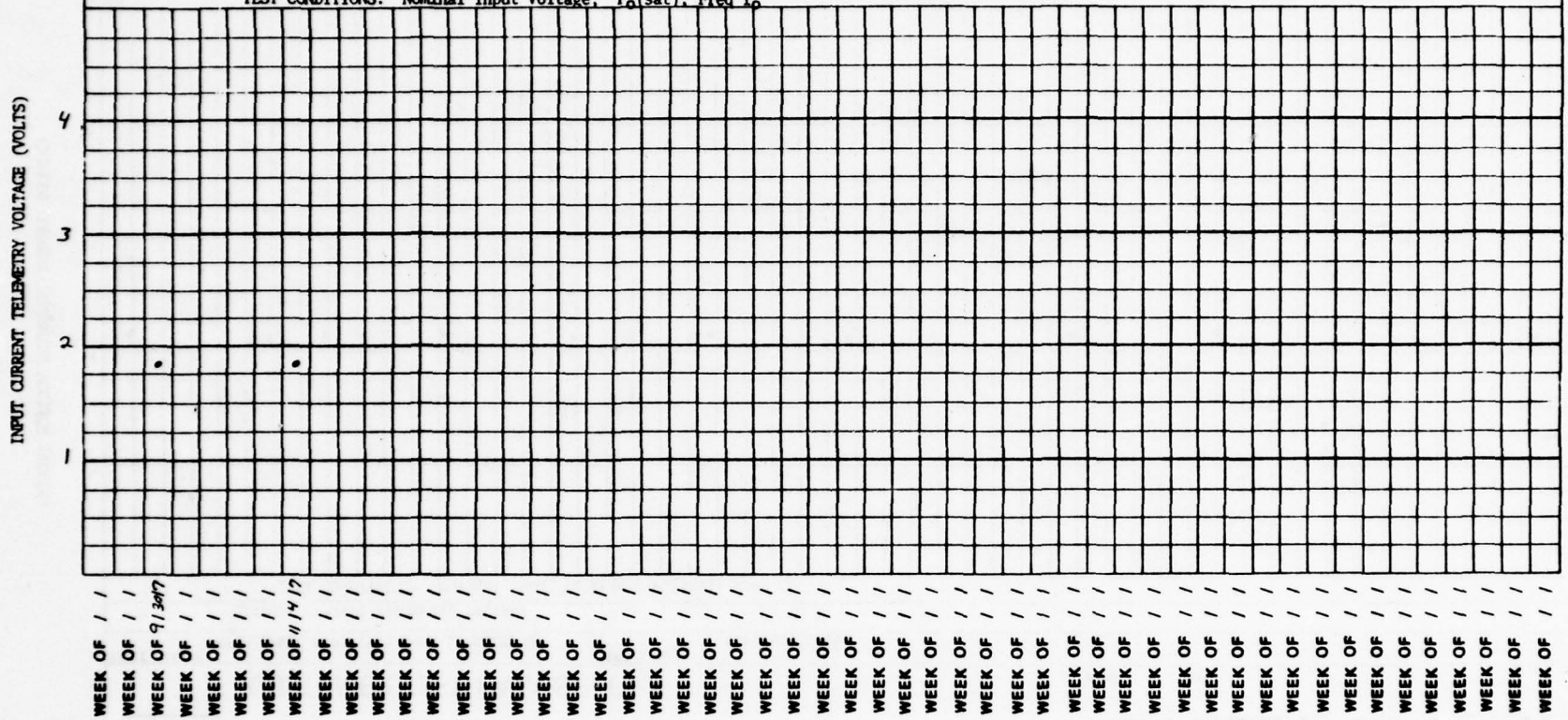
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

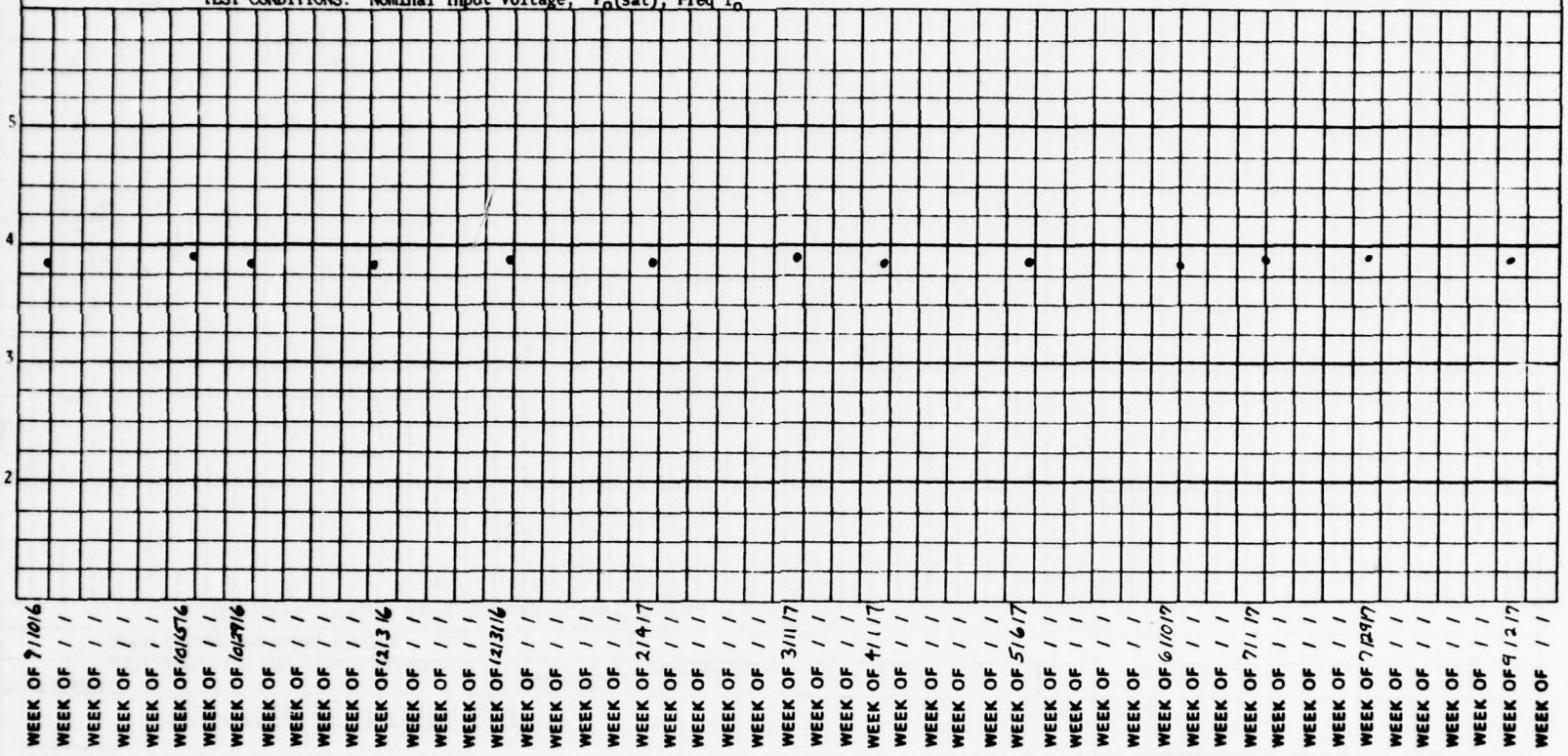
DATA SHEET NO. DSB200350-400 REV. ___
MODEL NO. B200350-121 / B200350-122 SERIAL NO. 12-3
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 | |

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ___
MODEL NO. B200350-121 / B200350-122 SERIAL NO. 12-3

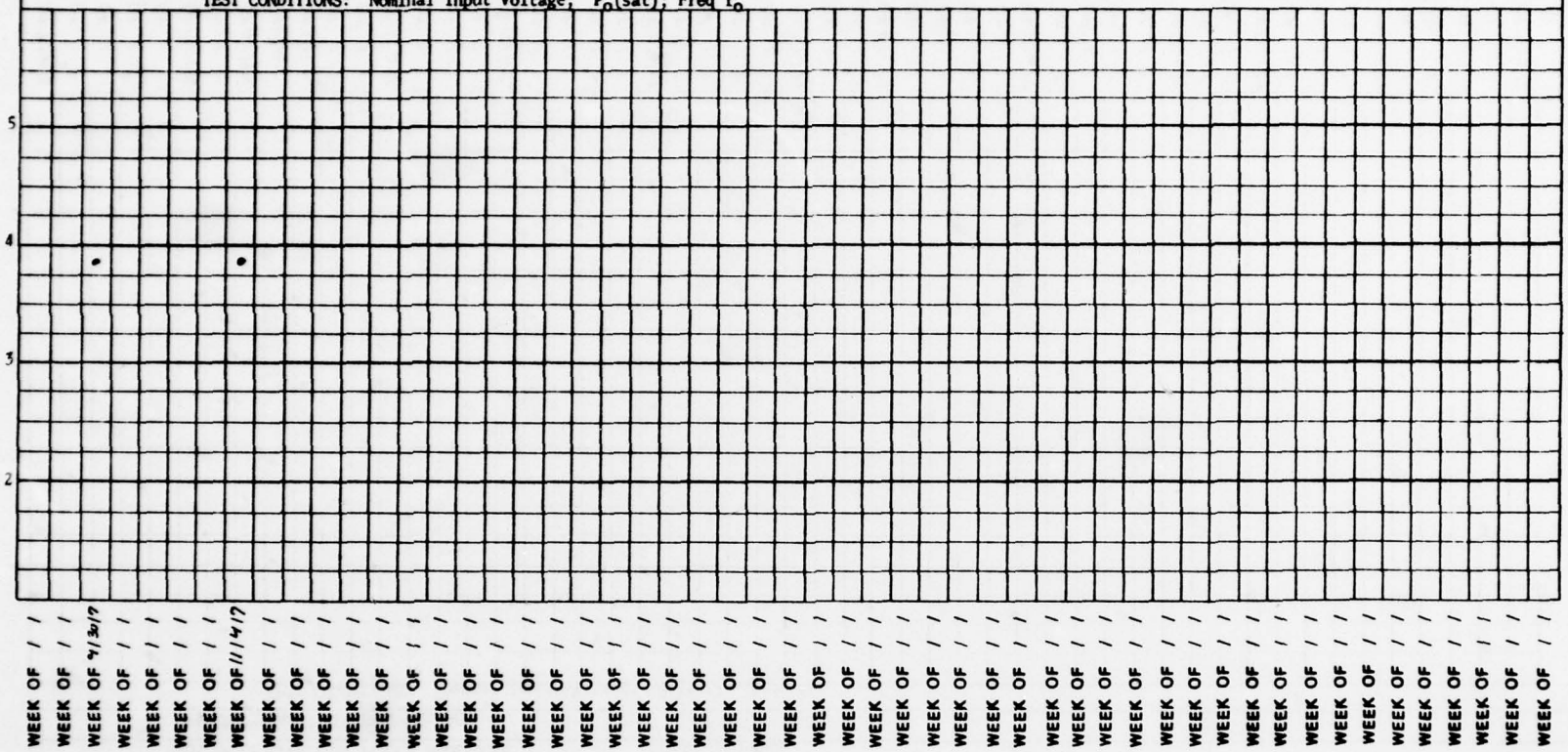
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS; Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 5/6/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 6/10/17
WEEK OF / /
WEEK OF / /
WEEK OF 7/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 7/29/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/2/17
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

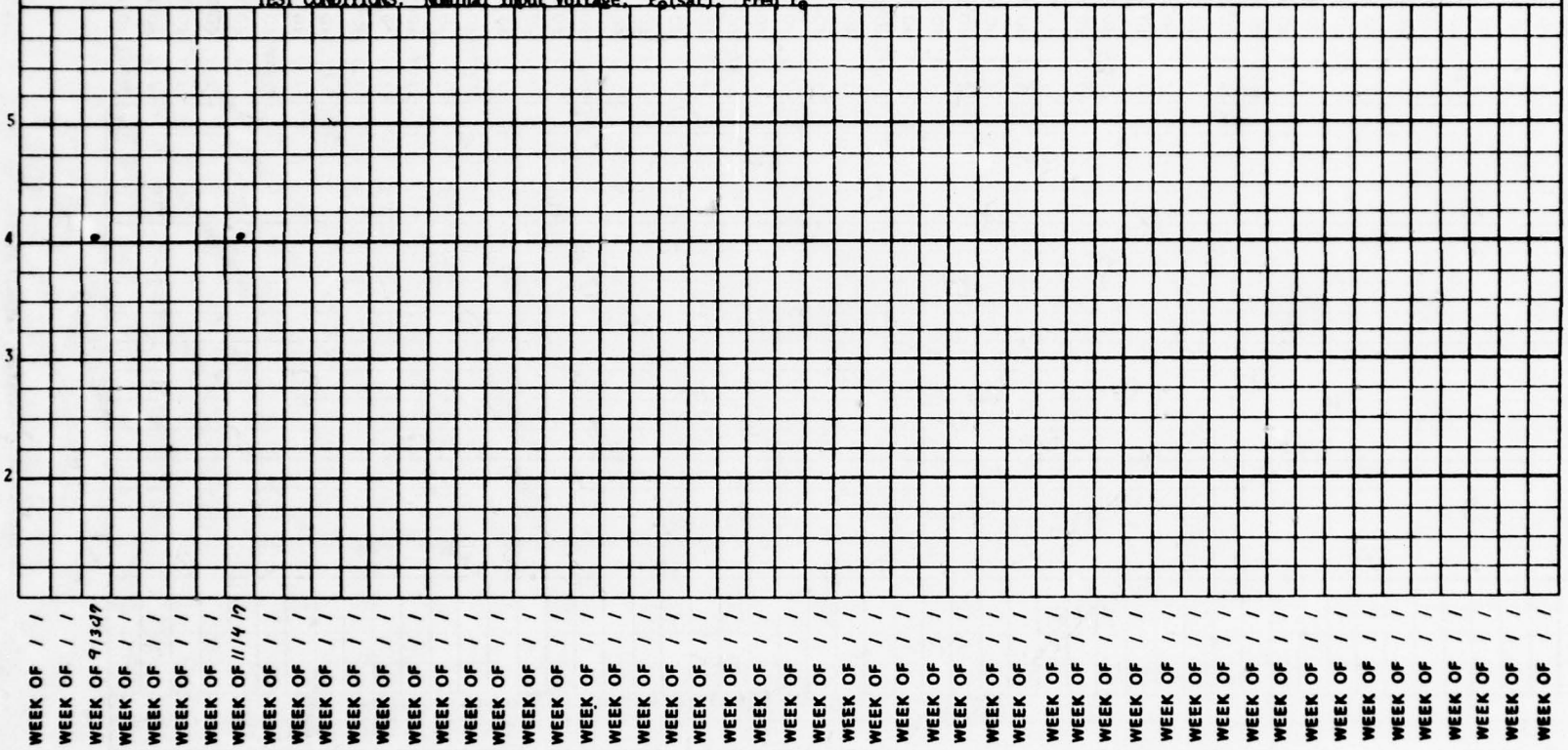
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. ~~DCSB200350-400~~ B200350-121 REV.

MODEL NO. ~~B200350-122~~ SERIAL NO. 12-3

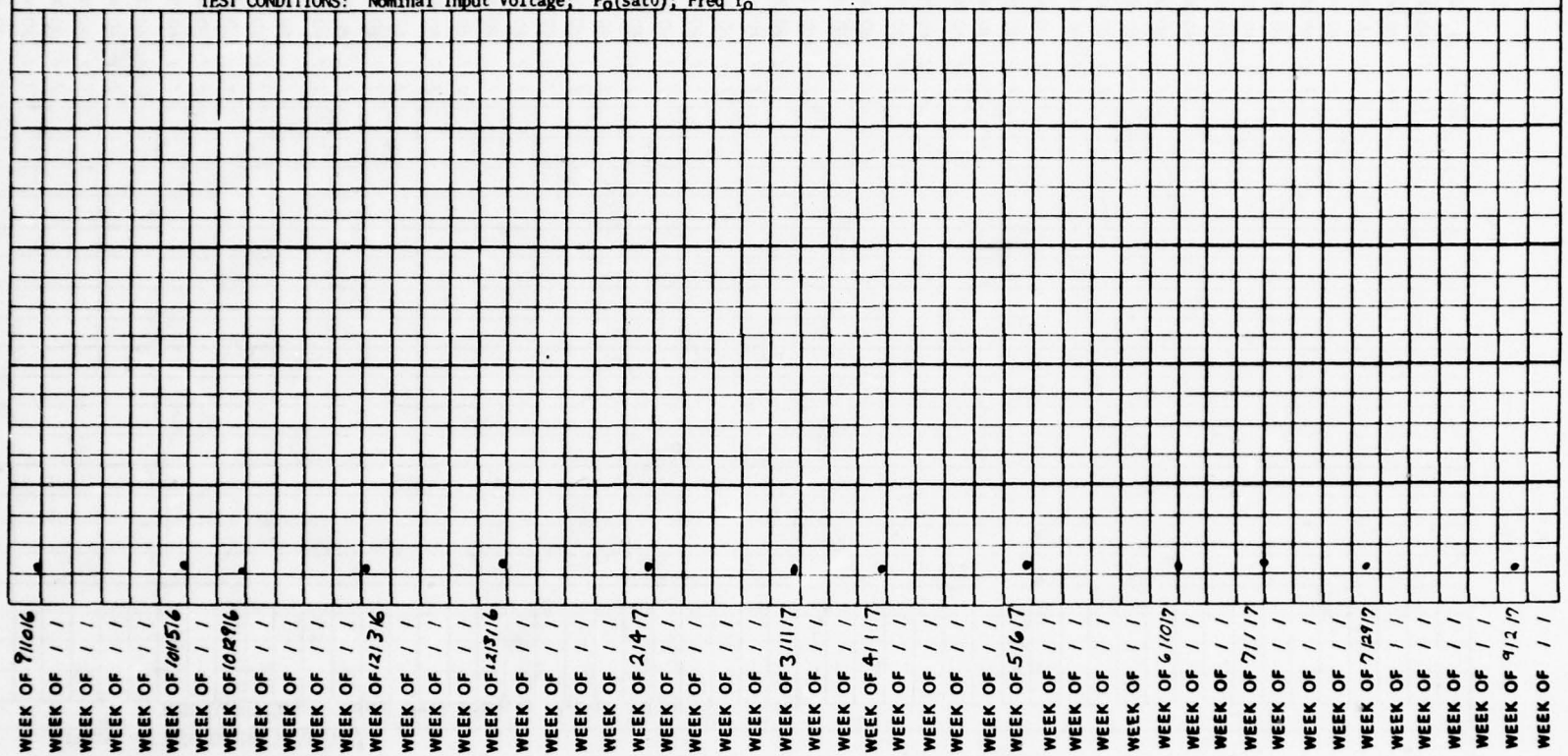
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. ~~DCB200350-400~~ B200350-121 REV. _____
MODEL NO. ~~B200350-122~~ SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$

HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

4
3
2
1

WEEK OF 1/1
WEEK OF 1/1
WEEK OF 9/30/17
WEEK OF 1/1
WEEK OF 1/1
WEEK OF 1/1
WEEK OF 1/1
WEEK OF 11/4/17
WEEK OF 1/1
WEEK OF 1/1
WEEK OF 1/1
WEEK OF 1/1

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___ ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

# CUSTOMER TEST DATA SHEET

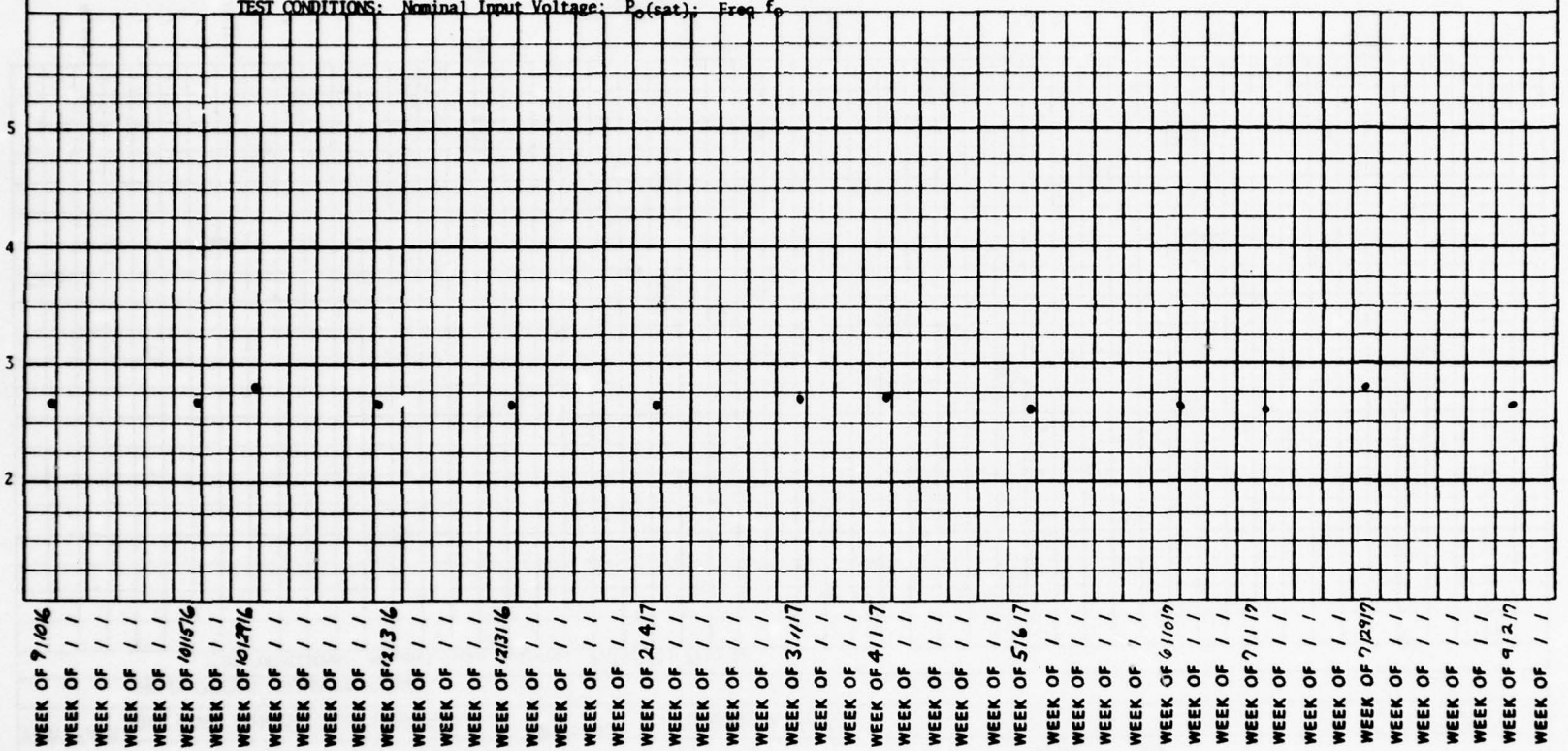
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-4 00 REV. ___ ___

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

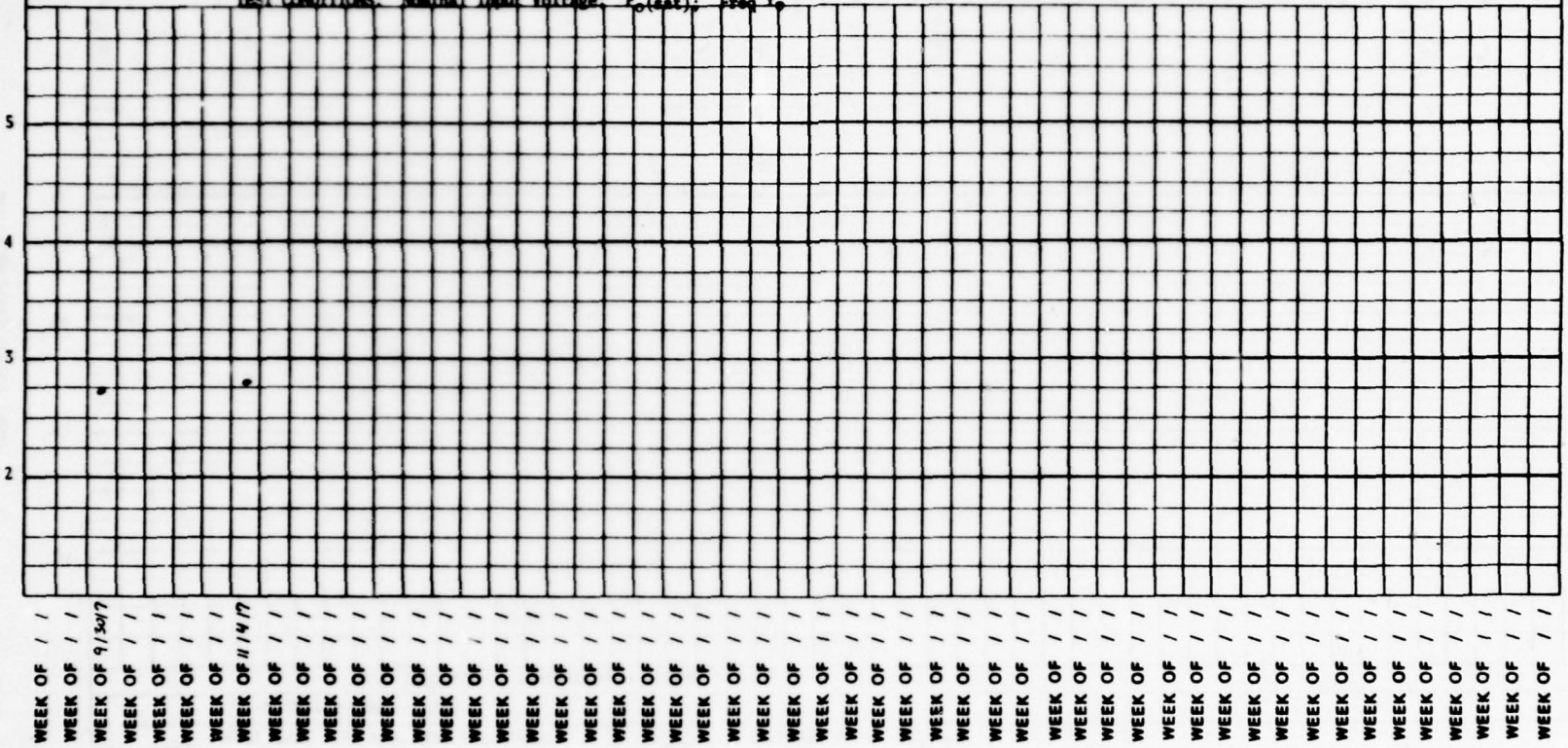
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$


CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)
5
4
3
2
WEEK OF / /
WEEK OF / /
WEEK OF 9/30/7
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/77
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 12-3

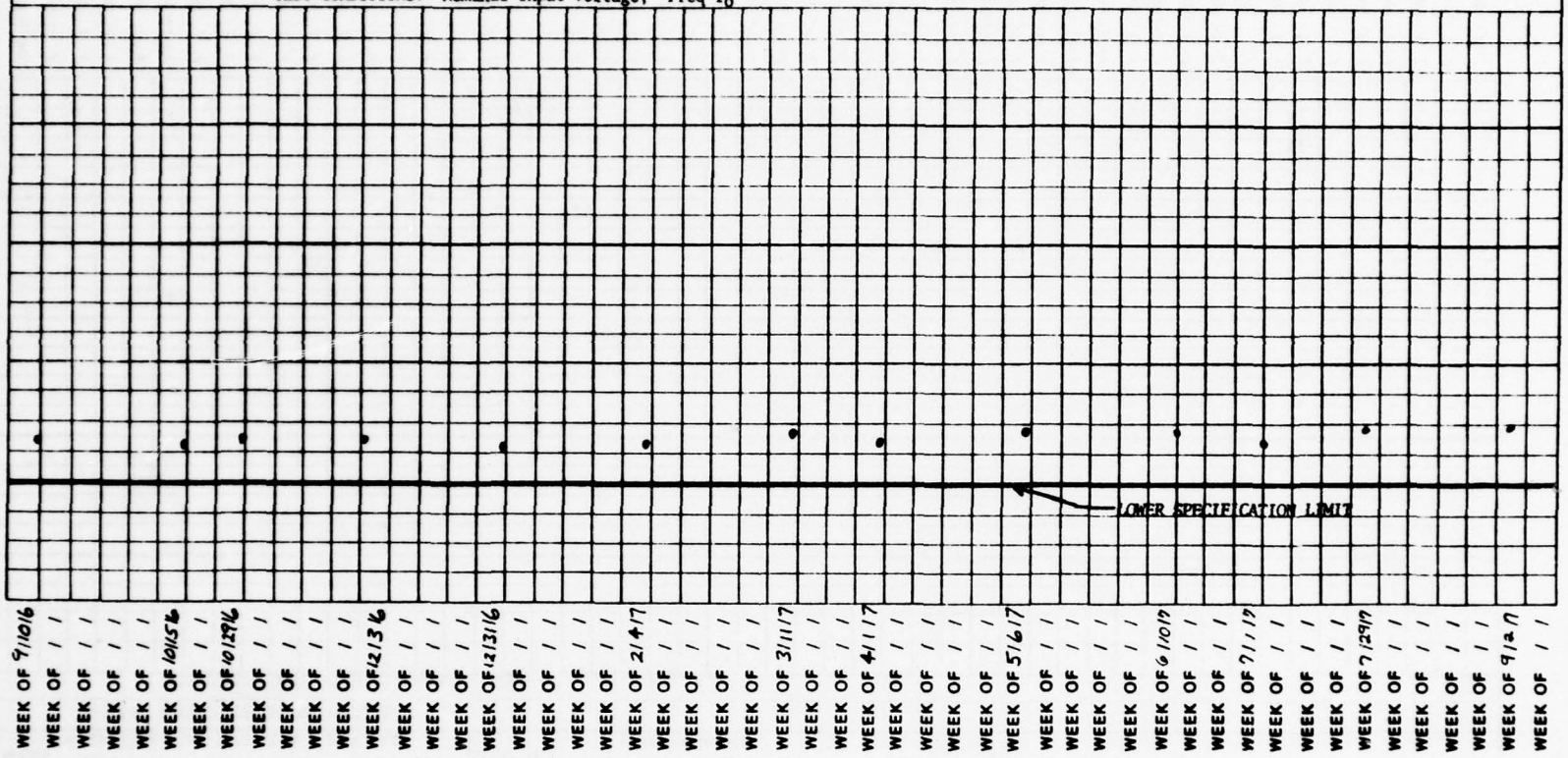
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 12-3

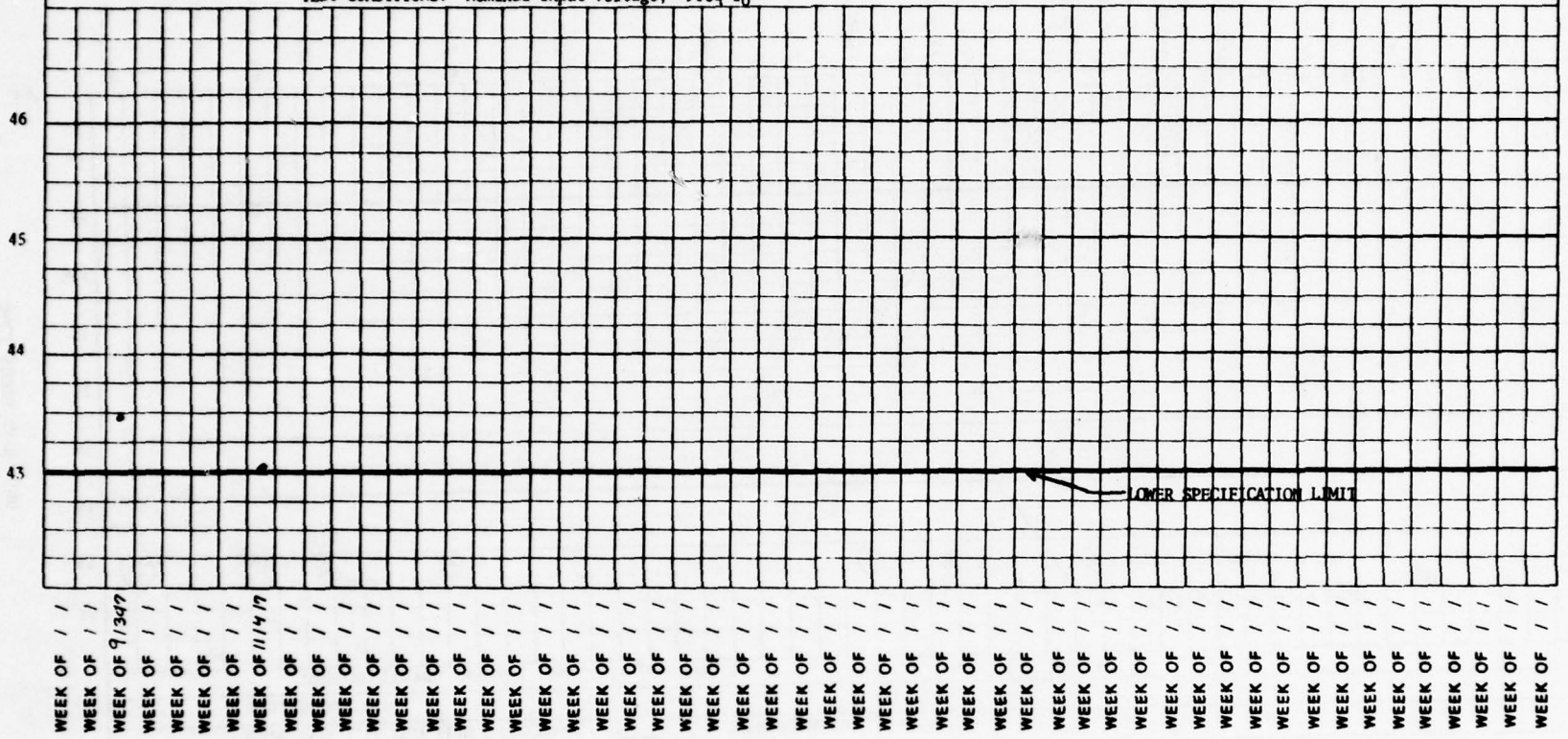
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA

DATA SHEET NO. DSB 200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

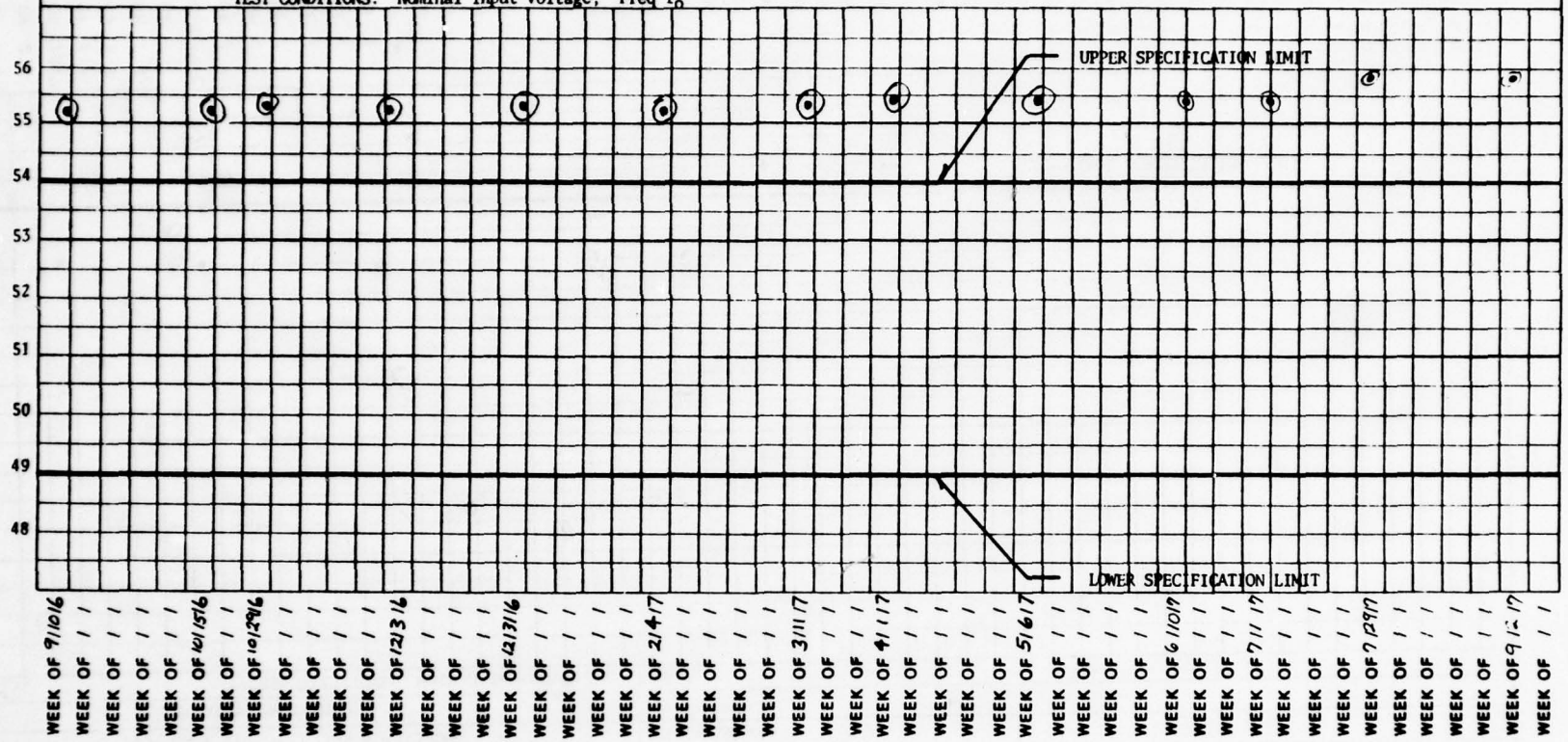
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ OUT OF SPEC

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB 200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

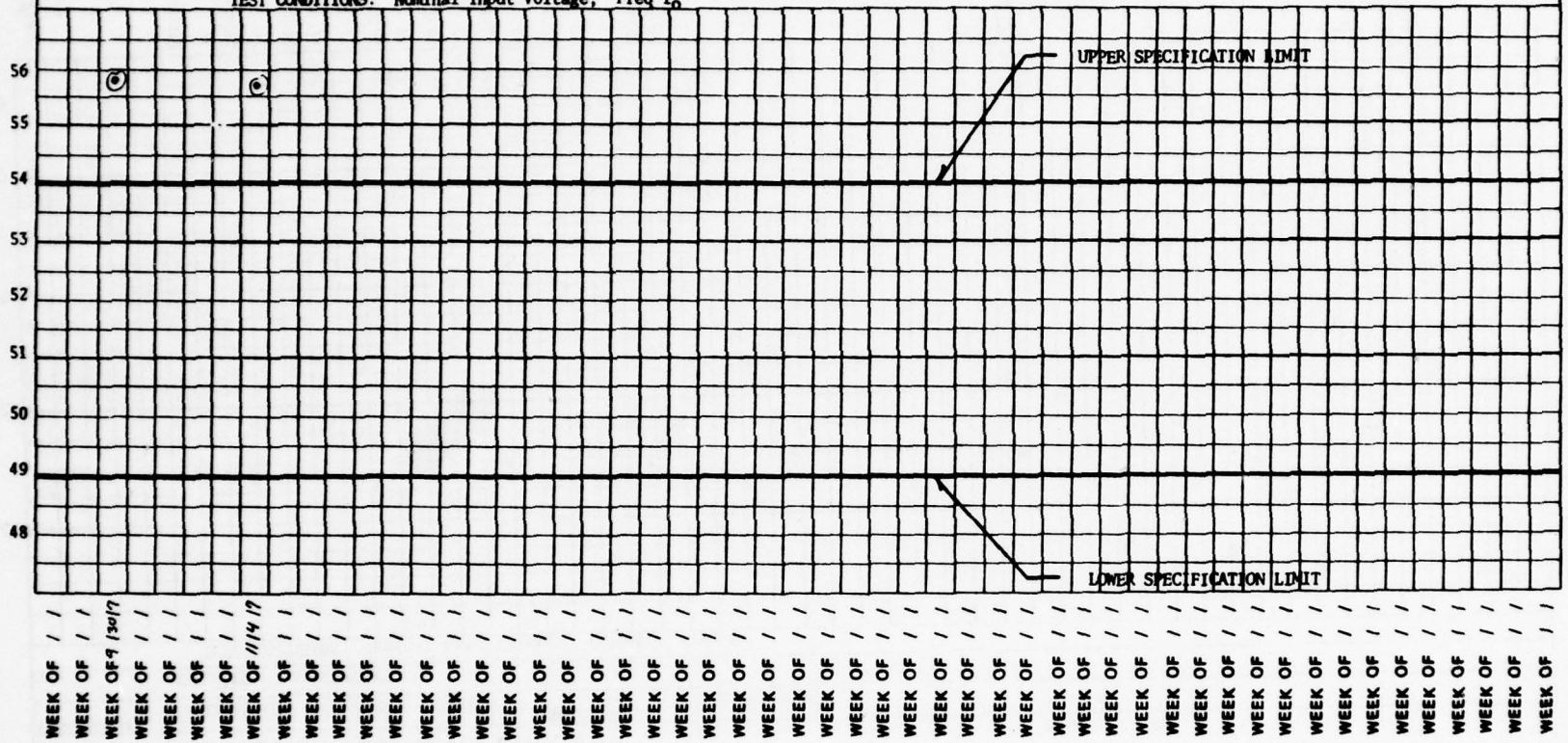
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ OUT OF SPEC

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

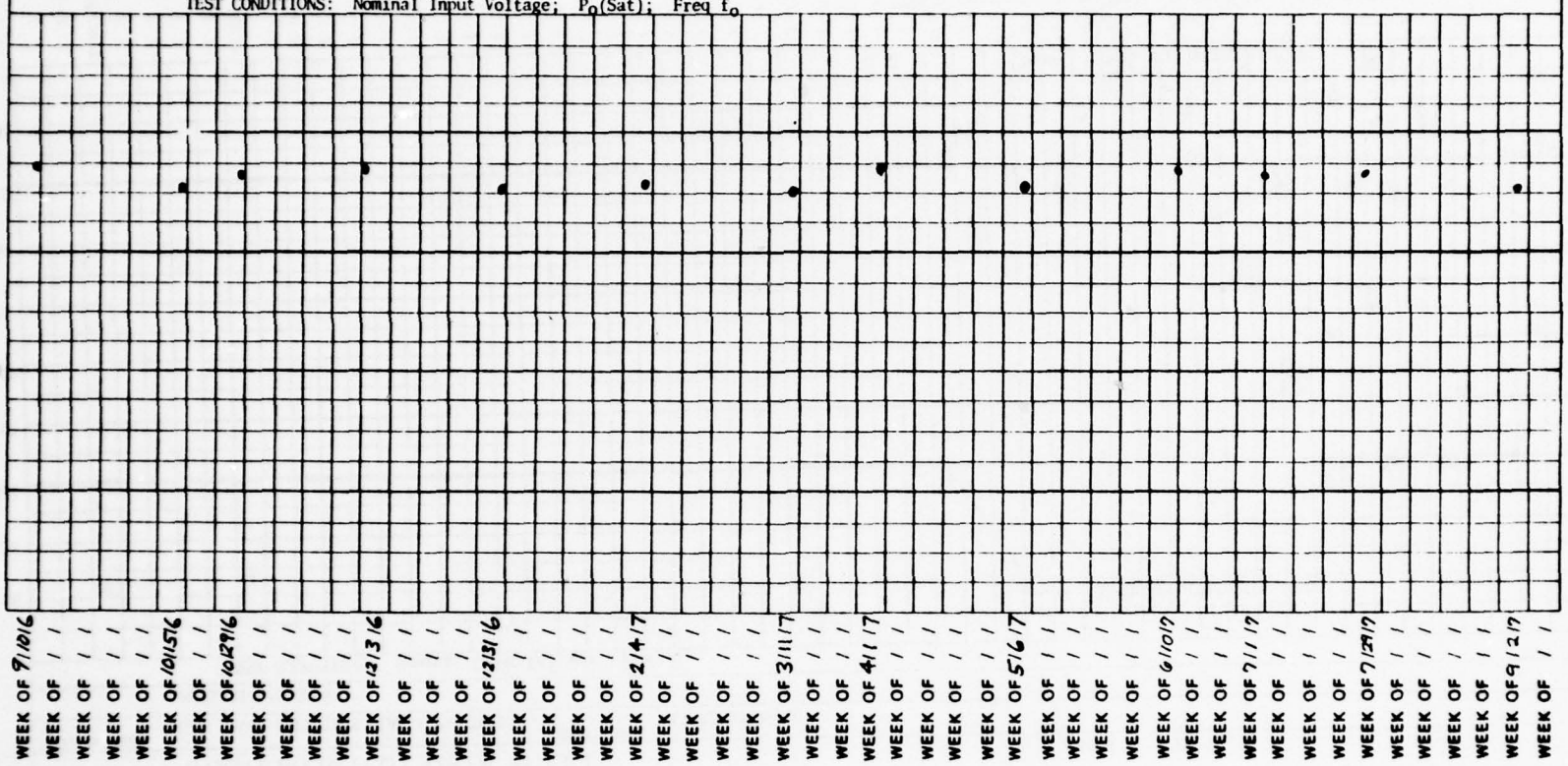
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

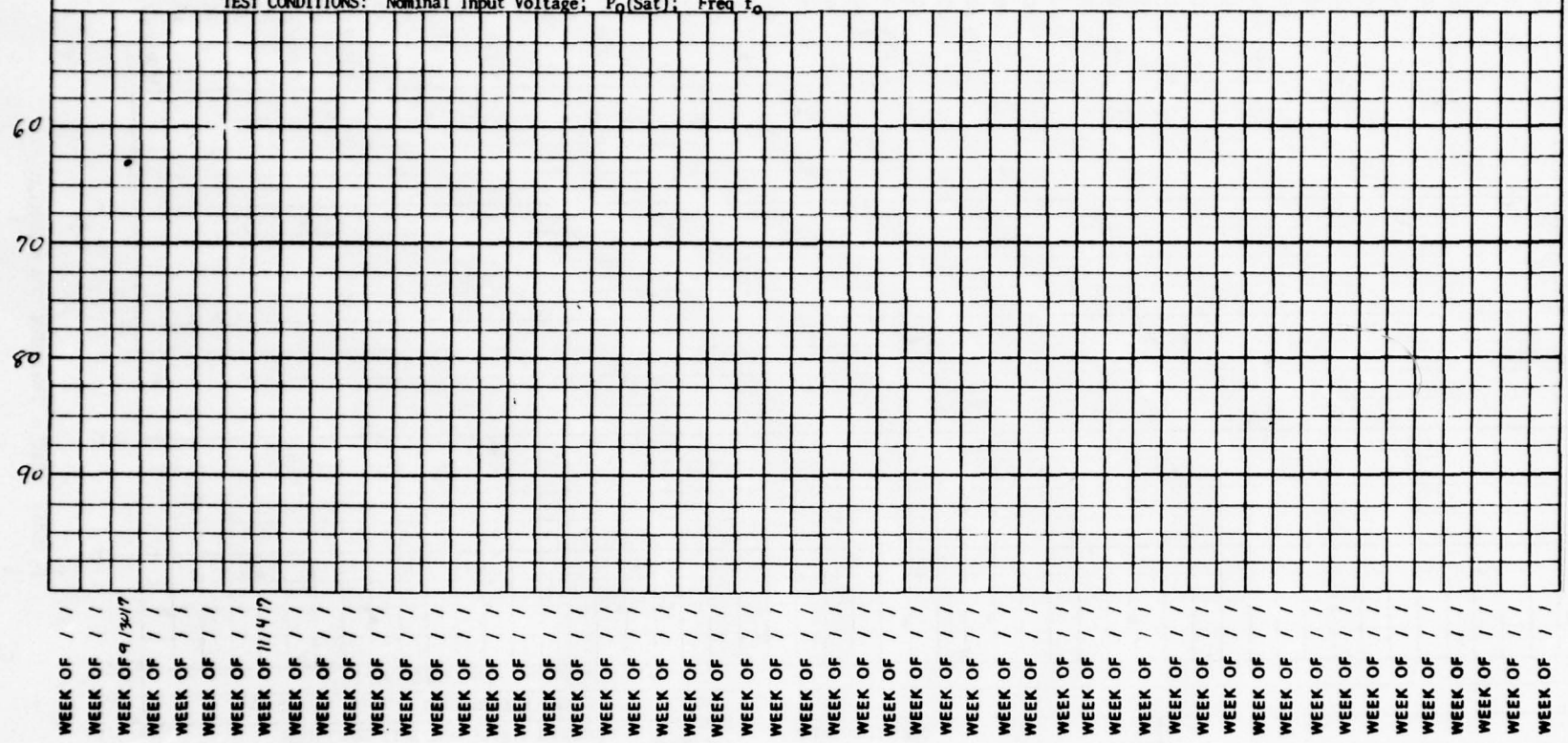
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

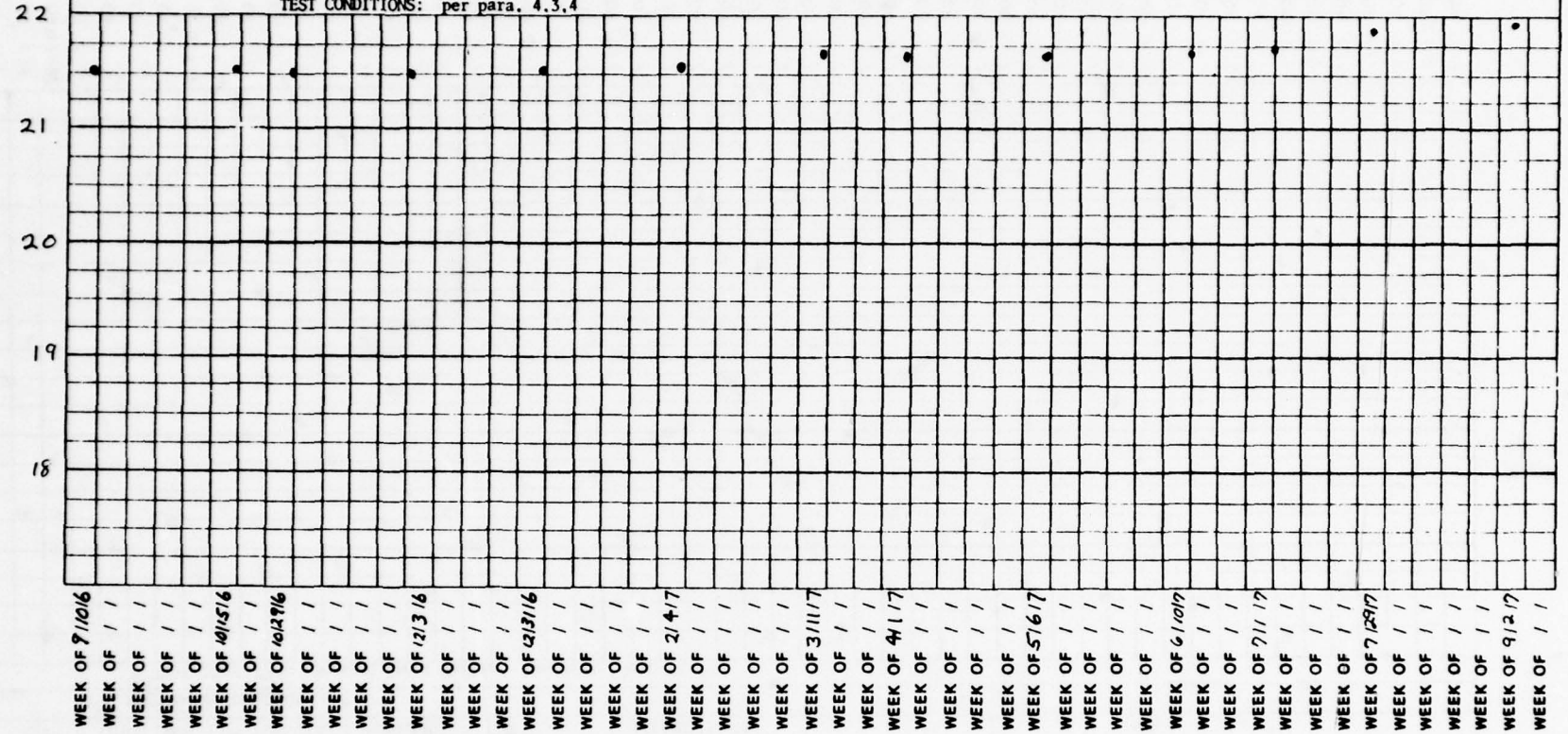
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 |
|---|---|---|---|

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4




ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

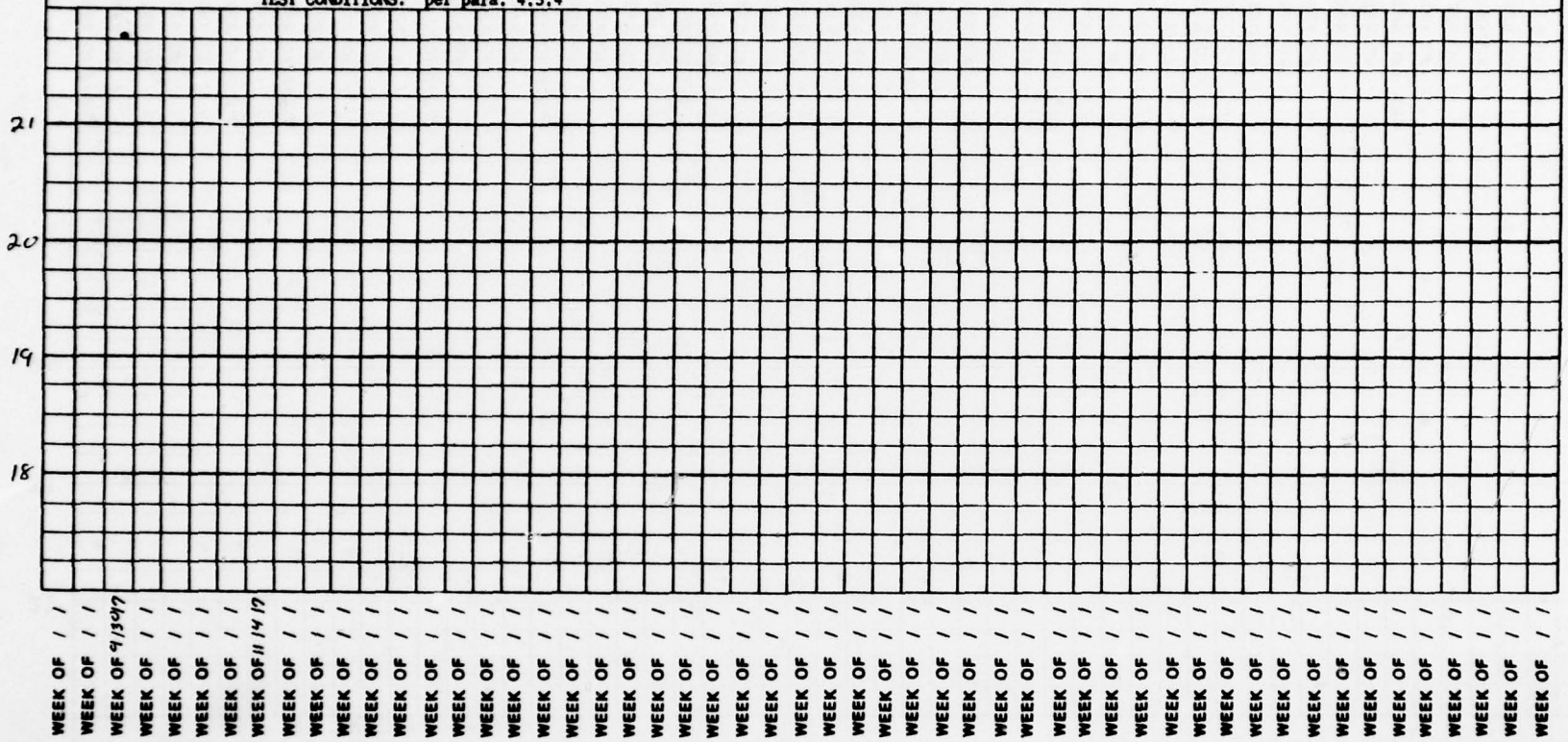
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 | |
|---|---|---|---|---|

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4


21
20
19
18
WEEK OF / /
WEEK OF / /
WEEK OF 9/1997
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/97
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

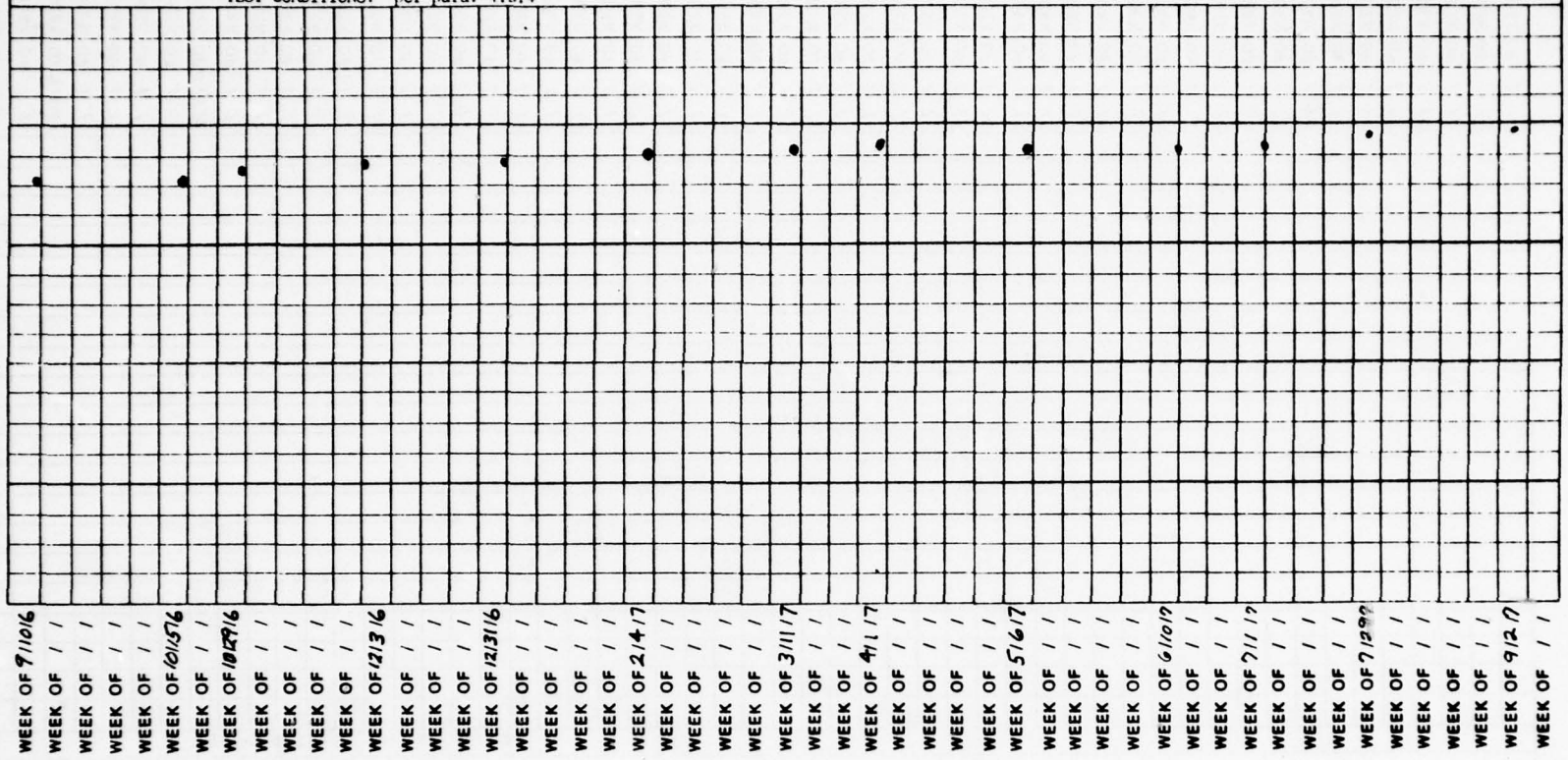
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO.: LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4

ATTENUATOR D.C. RESISTANCE - OUTPUT (OHMS)

22

21

20

19

WEEK OF / / WEEK OF / / WEEK OF 9/30/7 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF 11/4/7 WEEK OF / / WEEK OF / / WEEK OF / / WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

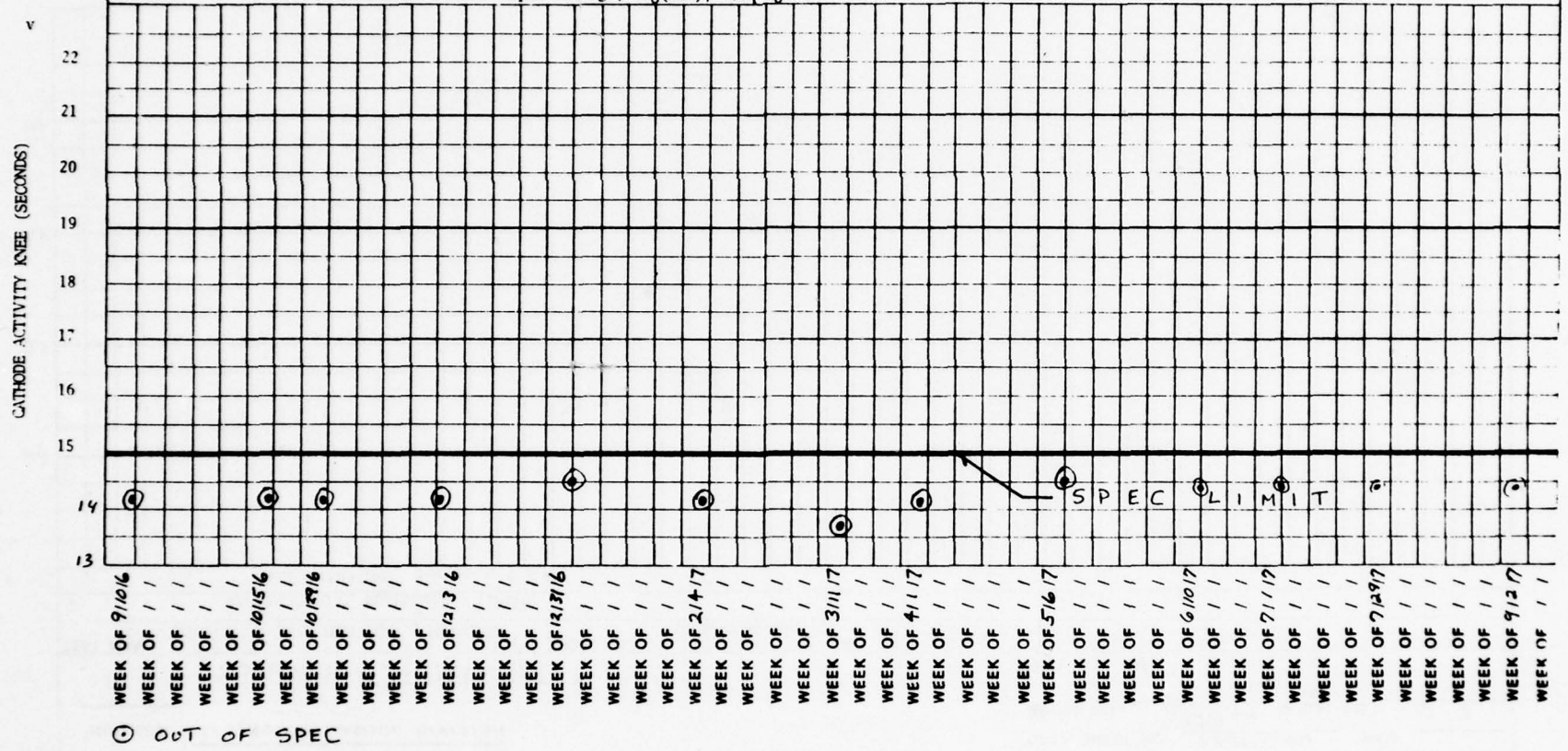
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




⊙ OUT OF SPEC

D-172

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 12-3

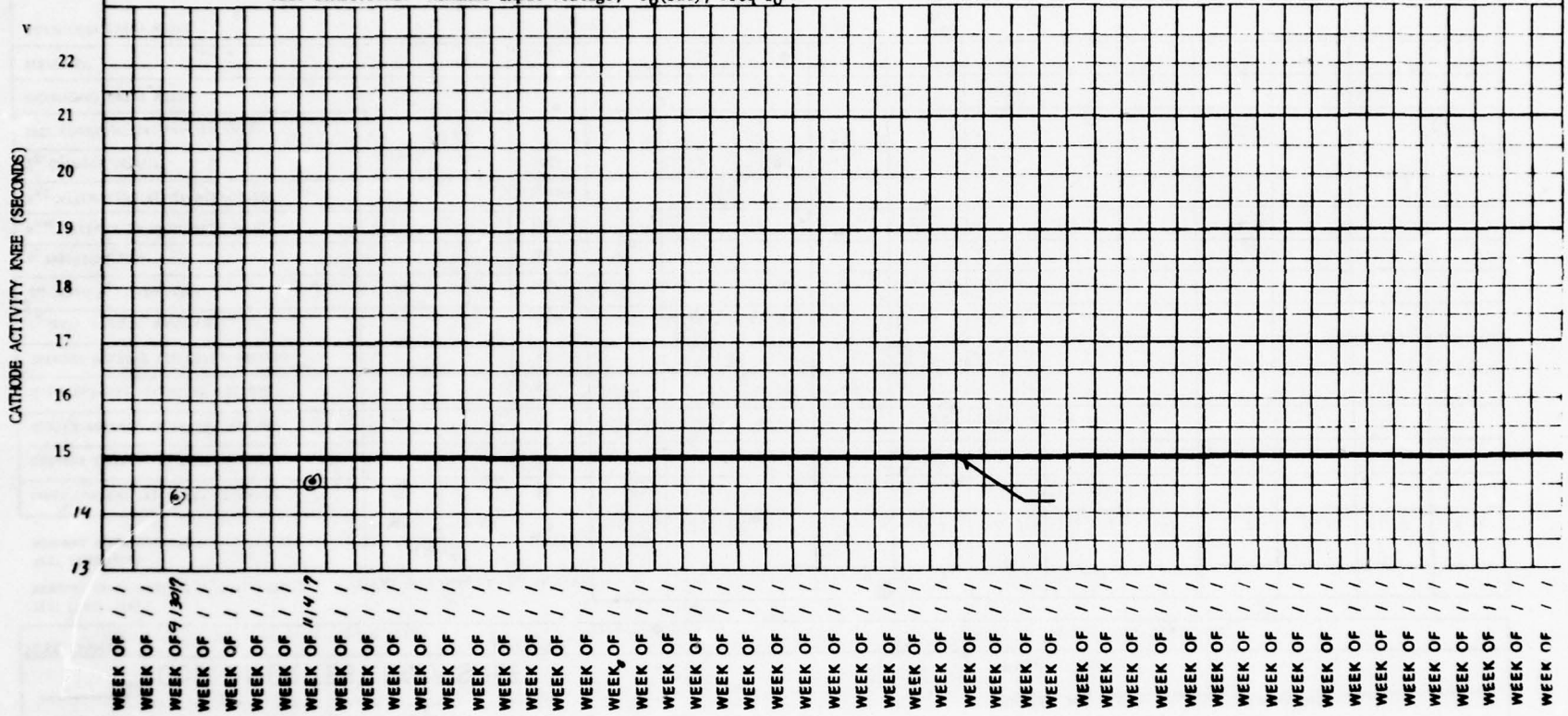
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




(*) OUT OF SPEC

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-402 REV.

MODEL NO. B200350-122 SERIAL NO. 22-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO.: LIPB200350-400 | ACCEPTANCE TEST DATA

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT) FREQ. $f_o$ / TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | PRE FINAL | FINAL | 6,600 | 13,349 | 20,019 | 26,358 | 50,066 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS NOMINAL INPUT VOLTAGE | | | | 4/12/71 | 4/15/71 | 2/15/72 | 12/13/72 | 10/2/73 | 7/31/74 | 11/1/77 | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.395 | 2.411 | 2.435 | 2.428 | 2.453 | 2.426 | 2.373 | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.776 | 3.977 | 3.766 | 3.777 | 3.789 | 3.767 | 3.802 | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.469 | 4.473 | 4.142 | 4.141 | 4.137 | 4.125 | 4.123 | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.736 | 0.795 | 0.852 | 0.800 | 0.812 | 0.916 | 0.717 | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.532 | 2.517 | 2.476 | 2.483 | 2.495 | 2.551 | 2.630 | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.45 | 43.30 | 43.45 | 43.50 | 43.10 | 43.65 | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 52.95 | 53.16 | 53.60 | 53.60 | 54.00 | 53.40 | 54.55 | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 17.5 | 17.0 | 16.3 | 21.1 | 15.3 | 14.2 | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

TWT has 501 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE

SPEC: LTPB 200350-400

SERIAL NO. 22-1



| SPEC. PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 200H | 50066 | HOUR |
| 4.1 | CATHODE ACTIVITY, SECONDS | 15.0 | | 17.5 | 16.2 | 14.2 | |
| 4.2 | STABILITY | | | ✓ | ✓ | | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | | |
| 4.4 | INRUSH CURRENT | | | | | | |
| a) | INTEGRAL >Iss, t=5msec, ma-sec | | 30 | 18.0 | 16.0 | 13.0 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 1.6 | 1.8 | 1.4 | |
| c) | I >Iss PRIOR TO H.V., AMPS | | 15 | 5.1 | 7.0 | 5.4 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 17.1 | 20.0 | 14 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, sec | 60 | 120 | 90 | 90 | 88 | |
| f) | I>Iss, t=5msec AFTER H.V., AMPS | | .75 | 0.4 | 0.5 | 0 | |
| g) | I WITHIN ±3% Iss + >100msec | | | ✓ | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, VSWR | | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 2.4 | 3.09 | 2.8 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.38 | 1.50 | 1.4 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.15 | 1.20 | 1.1 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.17 | 1.20 | 1.28 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | | |
| | 1) INPUT CURRENT TLM V | | | 2.411 | 2.453 | 2.393 | |
| | 2) CATHODE CURRENT TLM V | | | 3.999 | 3.989 | 3.802 | |
| | 3) HEATER VOLTAGE TLM V | | | 4.473 | 4.137 | 4.123 | |
| | 4) HELIX CURRENT TLM V | | | 0.795 | 0.812 | 0.717 | |
| | 5) CATHODE VOLTAGE TLM V | | | 2.517 | 2.495 | 2.63 | |
| b) | $P_o$ (SAT.), dBm | 43 | | 43.45 | 43.50 | 43.65 | |
| c) | G (SAT.), dB | 45 | 48 | 46.8 | 47.85 | 48.65 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 20014 | DATA 50066 | DATA HC |
|---|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.45 | 43.50 | 43.65 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.8 | 47.85 | 48.65 | |
| | 3) I in , AMPS | | | 4.190 | 4.195 | 4.172 | |
| | 4) Pin (DC), WATTS | | 103 | 96.37 | 96.485 | 95.45 | |
| b) | Vin = 33 ±.5V DC | | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.45 | 43.5 | 43.65 | |
| | 2) G (SAT.), dB | 45 | 48 | 46.8 | 47.85 | 48.65 | |
| | 3) I in , AMPS | | | 2.945 | 2.950 | 2.937 | |
| | 4) Pin (DC), WATTS | | 103 | 97.185 | 97.35 | 96.75 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.10 | ±0.10 | ±0.03 | |
| 4.9 | GAIN FLATNESS | | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | ✓ | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | | |
| a) | Gss , dB | 49 | 54 | 53.16 | 54.0 | 54.55 | |
| b) | G (Var), dB | | ±0.35 | ±0.31 | ±0.45 | ±0.40 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 53.16 | 54.0 | 54.55 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.31 | ±0.45 | ±0.40 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 53.16 | 54.0 | 54.55 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.31 | ±0.45 | ±0.40 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.0125 | 0.019 | 0.016 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.014 | 0.019 | 0.009 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.022 | 0.008 | 0.032 | |
| b) | Vin = 28 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.0125 | 0.019 | 0.016 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.014 | 0.019 | 0.009 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.022 | 0.008 | 0.032 | |
| c) | Vin = 33 ±.5V DC | | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.0125 | 0.019 | 0.016 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.014 | 0.019 | 0.009 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.022 | 0.008 | 0.032 | |
| 4.12 | NOISE FIGURE | | | | | | |
| a) | N.F., dB | | 33 | 28.0 | 28.0 | 27.0 | |

S/N _____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 20099 | 50066 | HOU |
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.5 | 10.2 | 9.9 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 22.3 | 21.6 | 22.9 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 28.7 | 28.0 | 28.5 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 27.6/30 | 33/30 | 35/30 | |
| 4.15 | AM/PM CONVERSION | | | | | | |
| | $\frac{\Delta\phi}{\Delta Pi(rf)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.6 | 1.6 | 2.4 | |
| b) | at 0dB | | 3.5 | 1.8 | 1.8 | 2.7 | |
| c) | at -2dB | | 3.5 | 2.1 | 2.0 | 2.8 | |
| d) | at -3dB | | 3.5 | 2.2 | 2.0 | 2.9 | |
| e) | at -4dB | | 3.5 | 2.1 | 2.0 | 3.0 | |
| f) | at -5dB | | 3.5 | 1.9 | 2.1 | 3.1 | |
| g) | at -6dB | | 3.5 | 1.7 | 2.1 | 3.1 | |
| h) | at -7dB | | 3.5 | 1.6 | 2.0 | 2.7 | |
| i) | at -8dB | | 3.5 | 1.4 | 1.8 | 2.1 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHZ LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.01 | 0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | ✓ | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 10.65 | 11.0 | 11.65 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO. LTPB200350-400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$ / TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 439 | 764 | 1172 | 1368 | 1587 | 1826 | 1990 | 2104 | 2242 | 2428 | 2596 | 2881 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/23/71 | week of 6/7/71 | week of 6/24/71 | week of 7/2/71 | week of 7/14/71 | week of 7/24/71 | week of 7/31/71 | week of 8/5/71 | week of 8/11/71 | week of 8/19/71 | week of 8/26/71 | week of 9/7/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.467 | 2.421 | 2.421 | 2.438 | 2.431 | 2.439 | 2.436 | 2.449 | 2.411 | 2.411 | 2.436 | 2.461 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.767 | 3.767 | 3.766 | 3.768 | 3.768 | 3.767 | 3.763 | 3.765 | 3.770 | 3.766 | 3.766 | 3.760 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.139 | 4.140 | 4.139 | 4.140 | 4.144 | 4.141 | 4.143 | 4.142 | 4.136 | 4.134 | 4.141 | 4.130 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .837 | .837 | .835 | .831 | .834 | .841 | .837 | .839 | .831 | .813 | .830 | .815 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.501 | 2.508 | 2.506 | 2.457 | 2.453 | 2.483 | 2.476 | 2.473 | 2.541 | 2.549 | 2.476 | 2.586 |
| $P_o$ (SAT) FREQ. $f_o$ :PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.35 | 43.35 | 43.40 | 43.35 | 43.40 | 43.35 | 43.45 | 43.50 | 43.50 | 43.55 | 43.31 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.06 | 52.73 | 52.51 | 52.63 | 52.76 | 52.90 | 53.11 | 52.61 | 53.10 | 53.10 | 53.16 | 54.07 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 18.0 | | 18.4 | | | | | | 17.8 | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | 7/21/71 | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT): FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 2931 week of 9/10/71 | 3074 week of 9/16/71 | 3233 week of 9/23/71 | 3429 week of 10/1/71 | 3583 week of 10/8/71 | 3724 week of 10/14/71 | 3893 week of 10/21/71 | 4031 week of 10/27/71 | 4224 week of 11/4/71 | 4385 week of 11/11/71 | 4582 week of 11/19/71 | 4702 week of 11/24/71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.481 | 2.472 | 2.404 | 2.400 | 2.425 | 2.456 | 2.390 | 2.412 | 2.40 | 2.409 | 2.410 | 2.420 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.767 | 3.768 | 3.768 | 3.767 | 3.763 | 3.766 | 3.764 | 3.770 | 3.759 | 3.762 | 3.751 | 3.763 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.151 | 4.149 | 4.135 | 4.133 | 4.138 | 4.142 | 4.133 | 4.136 | 4.131 | 4.136 | 4.129 | 4.134 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .862 | .847 | .843 | .833 | .810 | .840 | .823 | .831 | .829 | .841 | .830 | .847 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.384 | 2.402 | 2.556 | 2.570 | 2.505 | 2.461 | 2.603 | 2.560 | 2.505 | 2.545 | 2.550 | 2.548 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.45 | 43.50 | 43.52 | 43.55 | 43.50 | 43.60 | 43.50 | 43.50 | 43.40 | 43.40 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.46 | 53.40 | 52.96 | 53.51 | 53.06 | 53.46 | 53.40 | 53.40 | 53.40 | 53.46 | 53.50 | 53.50 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AM}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 11/2/71 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 4861 week of 12/1/71 | 5079 week of 12/10/71 | 5251 week of 12/17/71 | 5316 week of 12/22/71 | 5502 week of 12/30/71 | 5676 week of 1/6/72 | 5844 week of 1/13/72 | 6034 week of 1/22/72 | 6199 week of 1/28/72 | 6371 week of 2/4/72 | 6537 week of 2/11/72 | 6675 week of 2/17/71 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.412 | 2.421 | 2.390 | 2.410 | 2.432 | 2.410 | 2.40 | 2.40 | 2.45 | 2.44 | 2.42 | 2.42 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.766 | 3.766 | 3.764 | 3.775 | 3.763 | 3.767 | 3.77 | 3.77 | 3.76 | 3.77 | 3.76 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.135 | 4.139 | 4.143 | 4.133 | 4.140 | 4.140 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .84 | .837 | .86 | .84 | .856 | .84 | .85 | .84 | .86 | .85 | .85 | .84 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.556 | 2.545 | 2.471 | 2.550 | 2.503 | 2.55 | 2.55 | 2.53 | 2.46 | 2.50 | 2.52 | 2.53 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.40 | 43.50 | 43.45 | 43.45 | 43.45 | 43.45 | 43.60 | 43.50 | 43.50 | 43.45 | 43.40 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.15 | 53.10 | 53.10 | 53.00 | 53.00 | 53.00 | 53.00 | 53.00 | 52.90 | 53.00 | 53.30 | 53.30 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | 17.0 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 1/26/72 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 6799 week of 2/24/72 | 6965 week of 3/3/72 | 7109 week of 3/9/72 | 7308 week of 3/17/72 | 7449 week of 3/23/72 | 7611 week of 3/30/72 | 7733 week of 4/7/72 | 7970 week of 4/21/72 | 8122 week of 4/27/72 | 8313 week of 5/5/72 | 8481 week of 5/12/72 | 8621 week of 5/18/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.40 | 2.41 | 2.43 | 2.42 | 2.41 | 2.43 | 2.40 | 2.41 | 2.42 | 2.41 | 2.41 | 2.41 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.77 | 3.76 | 3.77 | 3.76 | 3.77 | 3.75 | 3.78 | 3.76 | 3.77 | 3.76 | 3.76 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | 4.13 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .77 | .83 | .77 | .80 | .80 | .79 | .74 | .81 | .77 | .78 | .82 | .78 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.53 | 2.53 | 2.47 | 2.50 | 2.50 | 2.48 | 2.57 | 2.53 | 2.52 | 2.53 | 2.55 | 2.53 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.45 | 43.50 | 43.50 | 43.50 | 43.50 | 43.50 | 43.40 | 43.40 | 43.40 | 43.70 | 43.65 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.20 | 53.20 | 53.50 | 53.40 | 53.50 | 53.40 | 53.30 | 53.30 | 53.50 | 53.50 | 53.70 | 53.70 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | 4/10/72 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**

# CUSTOMER TEST DATA SHEET

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-133 SERIAL NO. 22-1

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 8815 | 8976 | 9144 | 9318 | 9484 | 9651 | 9818 | 9981 | 10154 | 10316 | 10484 | 10645 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/26/72 | week of 6/2/72 | week of 6/9/72 | week of 6/16/72 | week of 6/23/72 | week of 6/30/72 | week of 7/7/72 | week of 7/14/72 | week of 7/21/72 | week of 7/28/72 | week of 8/4/72 | week of 8/11/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.41 | 2.41 | 2.39 | 2.40 | 2.40 | 2.43 | 2.41 | 2.42 | 2.41 | 2.37 | 2.39 | 2.39 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.78 | 3.76 | 3.76 | 3.77 | 3.77 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 | 3.76 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.14 | 4.14 | 4.13 | 4.13 | 4.13 | 4.14 | 4.13 | 4.13 | 4.13 | 4.12 | 4.13 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .79 | .80 | .82 | .81 | .81 | .81 | .73 | .773 | .74 | .79 | .79 | .79 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.53 | 2.53 | 2.61 | 2.59 | 2.60 | 2.53 | 2.54 | 2.52 | 2.53 | 2.65 | 2.60 | 2.62 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.60 | 43.60 | 43.60 | 43.65 | 43.65 | 43.60 | 43.60 | 43.65 | 43.65 | 43.65 | 43.65 | 43.55 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.40 | 53.70 | 53.70 | 53.60 | 53.70 | 53.80 | 53.70 | 53.85 | 53.80 | 53.80 | 53.70 | 53.90 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 10808 | 10951 | 11021 | 11105 | 11268 | 11433 | 11595 | 11768 | 11929 | 12100 | 12260 | 12428 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 8/18/72 | week of 8/28/72 | week of 8/31/72 | week of 9/8/72 | week of 9/15/72 | week of 9/22/72 | week of 9/29/72 | week of 10/6/72 | week of 10/13/72 | week of 10/20/72 | week of 10/27/72 | week of 11/3/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.40 | 2.42 | 2.42 | 2.44 | 2.49 | 2.41 | 2.45 | 2.44 | 2.41 | 2.47 | 2.44 | 2.43 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.77 | 3.76 | 3.77 | 3.77 | 3.76 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.13 | 4.13 | 4.13 | 4.14 | 4.15 | 4.13 | 4.14 | 4.15 | 4.13 | 4.14 | 4.14 | 4.14 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .80 | .80 | .81 | .81 | .84 | .80 | .81 | .84 | .80 | .80 | .81 | .80 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.60 | 2.53 | 2.60 | 2.50 | 2.37 | 2.56 | 2.47 | 2.48 | 2.49 | 2.43 | 2.43 | 2.44 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.60 | 43.50 | 43.50 | 43.55 | 43.45 | 43.50 | 43.40 | 43.45 | 43.50 | 43.50 | 43.50 | 43.50 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.80 | 54.10* | 54.00 | 54.00 | 54.00 | 53.80 | 53.90 | 54.00 | 53.60 | 53.90 | 54.10* | 54.00 |
| $L_L$ INSERTION LOSS | | | db | | | 66.60 | | | 66.70 | | | 66.90 | | | 69.00 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 18.53 | | | 18.57 | | | 18.62 | | | 18.66 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | - | | | - | | | 23.90 | | | - |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | 9/7/72 | | | 9/22/72 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 2. | | | | | | | 1. | | 2. | 1. |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. RAO Reading is intermittent.
2. *DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-1

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: TPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 12578 week of 11/10/72 | 12745 week of 11/17/72 | 12853 week of 11/22/72 | 13069 week of 12/1/72 | 13230 week of 12/8/72 | 13382 week of 12/15/72 | 13521 week of 12/21/72 | 13603 week of 12/29/72 | 13765 week of 1/5/73 | 13927 week of 1/12/73 | 14101 week of 1/19/73 | 14334 week of 1/29/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.40 | 2.41 | 2.43 | 2.40 | 2.43 | 2.41 | 2.43 | 2.40 | 2.42 | 2.41 | 2.47 | 2.40 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.76 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.13 | 4.13 | 4.13 | 4.13 | 4.14 | 4.14 | 4.14 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .78 | .81 | .79 | .79 | .79 | .78 | .78 | .73 | .77 | .78 | .73 | .73 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.50 | 2.47 | 2.45 | 2.51 | 2.53 | 2.51 | 2.51 | 2.56 | 2.55 | 2.54 | 2.55 | 2.58 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.50 | 43.55 | 43.50 | 43.50 | 43.50 | 43.50 | 43.50 | 43.50 | 43.45 | 43.45 | 43.50 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | 54.00 | 54.10* | 54.10* | 54.00 | 54.10* | 54.10* | 54.10* | 54.10* | 54.00 | 54.10* |
| $I_L$ INSERTION LOSS | | | db | | | 66.00 | | | 67.00 | | | 67.40 | | | 65.40 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 18.71 | | | 18.71 | | | 18.76 | | | 18.83 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | - | | | 19.30 | | | 19.52 | | | 19.52 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | 16.30 | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 1/12/73 | | |
| SIGNIFICANT EVENT NOTES | | | | | | 1. | 2 | 2 | | 2 | 2 | 2 | 2 | | 2 |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. $P_{AO}$ Reading is intermittent.
2. OUT OF SPECIFICATION - MIT.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-151 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT): FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 14423 week of 2/2/73 | 14596 week of 2/9/73 | 14758 week of 2/16/73 | 14925 week of 2/23/73 | 15086 week of 3/2/73 | 15275 week of 3/10/72 | 15419 week of 3/16/73 | 15588 week of 3/23/73 | 15749 week of 3/30/73 | 15922 week of 4/6/73 | 16090 week of 4/13/73 | 16258 week of 4/20/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.42 | 2.42 | 2.41 | 2.45 | 2.40 | 2.42 | 2.42 | 2.39 | 2.42 | 2.40 | 2.40 | 2.42 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.76 | 3.77 | 3.77 | 3.76 | 3.77 | 3.77 | 3.77 | 3.76 | 3.77 | 3.77 | 3.77 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.14 | 4.13 | 4.13 | 4.14 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .76 | .78 | .73 | .78 | .78 | .78 | .80 | .80 | .80 | .81 | .80 | .80 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.51 | 2.54 | 2.55 | 2.48 | 2.58 | 2.55 | 2.56 | 2.59 | 2.55 | 2.59 | 2.59 | 2.55 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.60 | 43.60 | 43.40 | 43.50 | 43.45 | 43.50 | 43.50 | 43.50 | 43.50 | 43.50 | 43.40 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.50 | 54.00 | 54.10# | 54.20# | 54.00 | 54.00 | 53.70 | 53.60 | 53.70 | 53.60 | 53.70 | 54.20# |
| $L_L$ INSERTION LOSS | | | db | | | 65.50 | | | | | | 66.00 | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 18.83 | | | | | | 18.85 | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 19.67 | | | | | | 20.55 | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | 4/4/73 | | |
| SIGNIFICANT EVENT NOTES | | | | | | 1., 2 | 2. | | | | | | | | 2. |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. RAO Reading is intermittent.
2. # OUT OF SPECIFICATION LIMIT.

HUGHES **ELECTRON DYNAMICS DIVISION**

# CUSTOMER TEST DATA SHEET

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 R200350-122 SERIAL NO. 22-1
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS / NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$ | TOTAL ACCUMULATED HOURS | | | 16403 | 16569 | 16735 | 16897 | 17070 | 17233 | 17409 | 17548 | 17714 | 17860 | 18026 | 18195 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONDITIONS / NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | week of 4/27/73 | week of 5/4/73 | week of 5/11/73 | week of 5/18/73 | week of 5/25/73 | week of 6/1/73 | week of 6/9/73 | week of 6/15/73 | week of 6/22/73 | week of 6/29/73 | week of 7/6/73 | week of 7/13/73 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.41 | 2.41 | 2.40 | 2.42 | 2.40 | 2.44 | 2.40 | 2.40 | 2.40 | 2.41 | 2.40 | 2.41 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.76 | 3.76 | 3.77 | 3.78 | 3.78 | 3.77 | 3.77 | 3.77 | 3.78 | 3.78 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.13 | 4.13 | 4.13 | 4.14 | 4.13 | 4.14 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .82 | .79 | .82 | .82 | .83 | .81 | .80 | .81 | .81 | .82 | .82 | .82 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.60 | 2.56 | 2.60 | 2.53 | 2.60 | 2.50 | 2.59 | 2.61 | 2.56 | 2.57 | 2.61 | 2.60 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.50 | 43.60 | 43.60 | 43.60 | 43.60 | 43.50 | 43.65 | 43.50 | 43.50 | 43.65 | 43.50 | 43.65 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.20* | 54.00 | 54.10* | 54.40* | 54.40* | 54.30* | 54.40* | 54.30* | 54.30* | 54.40* | 54.30* | 54.20* |
| $I_L$ INSERTION LOSS | | | db | | | 65.90 | | | | | | 65.00 | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 18.89 | | | | | | 18.89 | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 22.36 | | | | | | 23.23 | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 2 | | 1, 2 | 2. | 2 | 2 | 2 | 2 | 1. | 2 | 2 | 2 |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1 = Rev. Read no. is interim limit

2 = DOES NOT MEET SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS: 18525

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | week of 7/27/73 | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.41 | | | | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | | | | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.13 | | | | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .82 | | | | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.57 | | | | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.65 | | | | | | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10* | | | | | | | | | | | |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AM}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1 | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. * DOES NOT MEET SPECIFICATION LIMIT.

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-1

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | | | | 20,624 | 21,251 | 22,045 | 22,665 | 23,429 | 24,037 | 24,746 | 25,469 | 26,141 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/73 | 9/28/73 | 11/30/73 | 11/30/73 | 12/28/73 | 2/1/74 | 2/28/74 | 4/1/74 | 4/29/74 | 5/28/74 | 6/27/74 | 7/27/74 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | | | 2.49 | 2.41 | 2.41 | 2.43 | 2.43 | 2.41 | 2.39 | 2.40 | 2.43 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | | | 3.77 | 3.77 | 3.77 | 3.77 | 3.78 | 3.78 | 3.78 | 3.78 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | | | 4.13 | 4.12 | 4.12 | 4.13 | 4.13 | 4.12 | 4.12 | 4.12 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | | | .78 | .78 | .77 | .78 | .77 | .77 | .77 | .77 | .78 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | | | 2.52 | 2.55 | 2.55 | 2.48 | 2.52 | 2.55 | 2.61 | 2.61 | 2.48 |
| $P_o$ (SAT) FREQ $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | | | 43.5 | 43.5 | 43.5 | 43.5 | 43.6 | 43.6 | 43.6 | 43.5 | 43.4 |
| $G_m$ FREQ $f_o$ (PARA 4.3.1) | 49 | 54 | db | | | | 53.9 | 54.0 | 53.9 | 53.7 | 54.0 | 53.9 | 53.0 | 53.8 | 53.8 |
| $I_L$ INSERTION LOSS | | | db | 65.5 | 64.4 | 64.2 | 64.2 | 65.2 | 64.9 | 64.6 | 64.4 | 64.0 | 63.5 | 63.3 | 63.2 |
| $R_{AI}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 19.18 | 19.18 | 19.17 | 19.17 | 19.20 | 19.25 | 19.27 | 19.35 | 19.40 | 19.43 | 19.47 | 19.51 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | INT.** | INT.** | 19.41 | 19.41 | 19.63 | 19.72 | 20.05** | 20.00** | 19.80** | 19.98** | 20.13 | 20.10 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | 15.8 | 15.9 | 16.3 | 15.0 | 15.3 | 15.2 | 16.2 | 15.3 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | 8/? | 11/23/73 | 11/28/73 | 11/28/73 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

** Intermittent.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ / TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS | 26,882 | 27624 | 28,390 | 29,123 | 29,723 | 30513 | 31,122 | 31,776 | 32,589 | 33,327 | 33,996 | 34703 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 8/28/74 | 9/30/74 | 11/1/74 | 12/3/14 | 12/28/13 | 1/30/25 | 2/27/5 | 3/27/5 | 4/30/5 | 5/31/75 | 7/2/75 | 8/2/5 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 2.403 | 2.413 | 2.407 | 2.41 | 2.40 | 2.43 | 2.40 | 2.41 | 2.41 | 2.39 | 2.42 | 2.42 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.769 | 3.785 | 3.78 | 3.78 | 3.77 | 3.77 | 3.77 | 3.78 | 3.77 | 3.77 | 3.78 | 3.79 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.122 | 4.122 | 4.12 | 4.13 | 4.12 | 4.13 | 4.12 | 4.12 | 4.12 | 4.12 | 4.13 | 4.12 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .738 | .764 | .73 | .69 | .72 | .726 | .65 | .69 | .70 | .66 | .68 | .68 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.58 | 2.58 | 2.55 | 2.52 | 2.54 | 2.47 | 2.48 | 2.52 | x2.50 | 2.54 | 2.49 | 2.51 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.35 | 43.25 | 43.5 | 43.5 | 43.4 | 43.5 | 43.3 | 43.55 | 43.5 | 43.5 | 43.55 | 43.6 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | | 53.6 | 53.5 | 53.7 | 53.7 | 53.7 | 53.7 | 53.3 | 53.9 | 54.0 | 54.0 | 54.00 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | 64.2 | 64.0 | 63.9 | 64.0 | 63.3 | 64.4 | 64.0 | 62.8 | 63.3 | 62.2 | 62.0 | 61.5 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 19.21 | 19.27 | 19.35 | 19.42 | 19.50 | 19.54 | 19.58 | 19.65 | 19.66 | 19.75 | 19.77 | 19.81 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 19.51 | 19.56 | 19.79 | 20.00* | 20.36 | 20.30 | 20.28 | 20.15 | 20.20 | 20.49 | 20.45 | 20.25 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 15.8 | 15.0 | 15.0 | 15.3 | 15.5 | 15.5 | 15.0 | 15.0 | 15.2 | 15.1 | 15.2 | 15.0 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | 7-24-4 | 7-24-4 | 7-24-4 | 11-21-4 | 11-21-4 | 11-21-4 | 1-31-5 | 1-31-5 | 1-31-5 | 4-1-5 | 4-1-5 | 7-30-5 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | WPN | W.P.N | WPN | W.P.N | W.P.N | WPN | WPN |

SIGNIFICANT EVENT NOTES
* INTERMITTENT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 41,186 35,475 9 13 15 | 36,215 10 14 15 | 36,882 11 11 15 | 37,656 12 13 15 | 38890 1 1 14 16 | 39,091 2 13 16 | 39760 3 12 16 | 40,569 4 15 16 | 41,110 4 28 16 | 41,927 6 11 16 | 42,590 6 29 16 | 44,106 9 18 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | v | 2.42 | 2.41 | 2.43 | 2.42 | 2.41 | 2.46 | 2.43 | 2.42 | 2.41 | 2.44 | 2.41 | 2.41 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | v | 3.78 | 3.78 | 3.78 | 3.78 | 3.79 | 3.79 | 3.80 | 3.80 | 3.79 | 3.79 | 3.81 | 3.81 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | v | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.14 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 | 4.13 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | v | .67 | .68 | .67 | .68 | .72 | .71 | .67 | .66 | .69 | .68 | .68 | .66 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | v | 2.47 | 2.49 | 2.45 | 2.47 | 2.54 | 2.41 | 2.48 | 2.51 | 2.52 | 2.48 | 2.52 | 2.48 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.6 | 43.5 | 43.5 | 43.5 | 43.5 | 43.55 | 43.45 | 43.50 | 43.45 | 43.45 | 43.50 | 43.55 |
| $G_{SS}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.0 | 54.0 | 54.1** | 54.1** | 54.1** | 54.1** | 54.0 | 54.0 | 54.10** | 54.1** | 54.25* | 54.2 |
| $I_L$ INSERTION LOSS | | | db | 62.5 | 62.4 | 63.0 | 63.2 | 62.6 | 62.9 | 62.0 | 62.0 | 61.4 | 60.0 | 62.5 | 61.0 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 19.87 | 19.90 | 19.95 | 19.96 | 19.95 | 19.96 | 20.00 | 20.05 | 20.10 | 20.16 | 20.10 | 20.23 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 21.30 | 21.15 | 20.5* | 20.51 | 21.70* | 21.05* | 20.65 | 20.80 | 20.62 | 20.54 | 20.40 | 20.50 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 15.1 | 15.0 | 15.2 | 15.2 | 14.7** | 15.1 | 15.1 | 15.0 | 14.7** | 14.4* | 14.4* | 14.4 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-30-5 | 7-30-5 | 10-295 | 10-29-5 | 10-29-5 | 2-3-6 | 2-3-6 | 2-3-6 | 2-3-6 | 5-7-6 | 5-12-6 | 7-23-6 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | WPN | WPN | W.P.N | W.P.N | W P.N | W.P.N | M.S.K. | W.P.N | MSK | W.P.N | MSK | WPN |

SIGNIFICANT EVENT NOTES

* NOT STABLE
** out of specification limit

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$ | LIMITS MIN | LIMITS MAX | UNITS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL ACCUMULATED HOURS | | | | 45,049 | 45,273 | 46,018 | 46,701 | 47,529 | 48,245 | 48,999 | 50,066 | | | | |
| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | | | | 10/1/76 | 10/27/76 | 11/27/76 | 12/28/76 | 7/29/77 | 8/29/77 | 9/29/77 | 11/1/77 | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.438 | 2.667 | 2.695 | 2.675 | 2.405 | 2.442 | 2.450 | 2.373 | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.812 | 3.815 | 3.809 | 3.816 | 3.827 | 3.823 | 3.823 | 3.802 | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.140 | 4.126 | 4.132 | 4.140 | 4.123 | 4.128 | 4.130 | 4.123 | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .706 | .740 | .725 | .742 | .722 | .754 | .742 | .719 | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.475 | 2.602 | 2.567 | 2.496 | 2.609 | 2.55 | 2.54 | 2.63 | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.56 | 43.60 | 43.60 | 43.55 | 43.55 | 43.62 | 43.65 | 43.65 | | | | |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.13* | 54.10 | 54.25 | 54.15* | 54.45 | 54.85* | 54.55 | 54.55 | | | | |
| $I_L$ INSERTION LOSS | | | db | 63 | 62 | 62 | 62 | 64 | 64 | 63 | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 20.22 | 20.28 | 20.25 | 20.28 | 20.25 | 20.22 | 20.26 | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 20.65 | 20.58 | 20.58 | 20.55 | 20.45 | 20.49 | 20.52 | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 15.0 | 14.5* | 15.0 | 15.10 | 14.8 | 14.4 | 14.0 | 14.2 | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8-31-6 | 8-31-6 | 10-19-6 | 8-31-6 | 5-2-77 | 7-27-77 | 8-31-77 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | 1. | | | | |
| TESTED BY | | | | msk | msk | msk | msk | msk | [illegible] | MKB | | | | | |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.
1. END OF CONTRACT

No data available January 1977 thru July 1977. TWTA on loan to JPL, Pasadena, California.

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

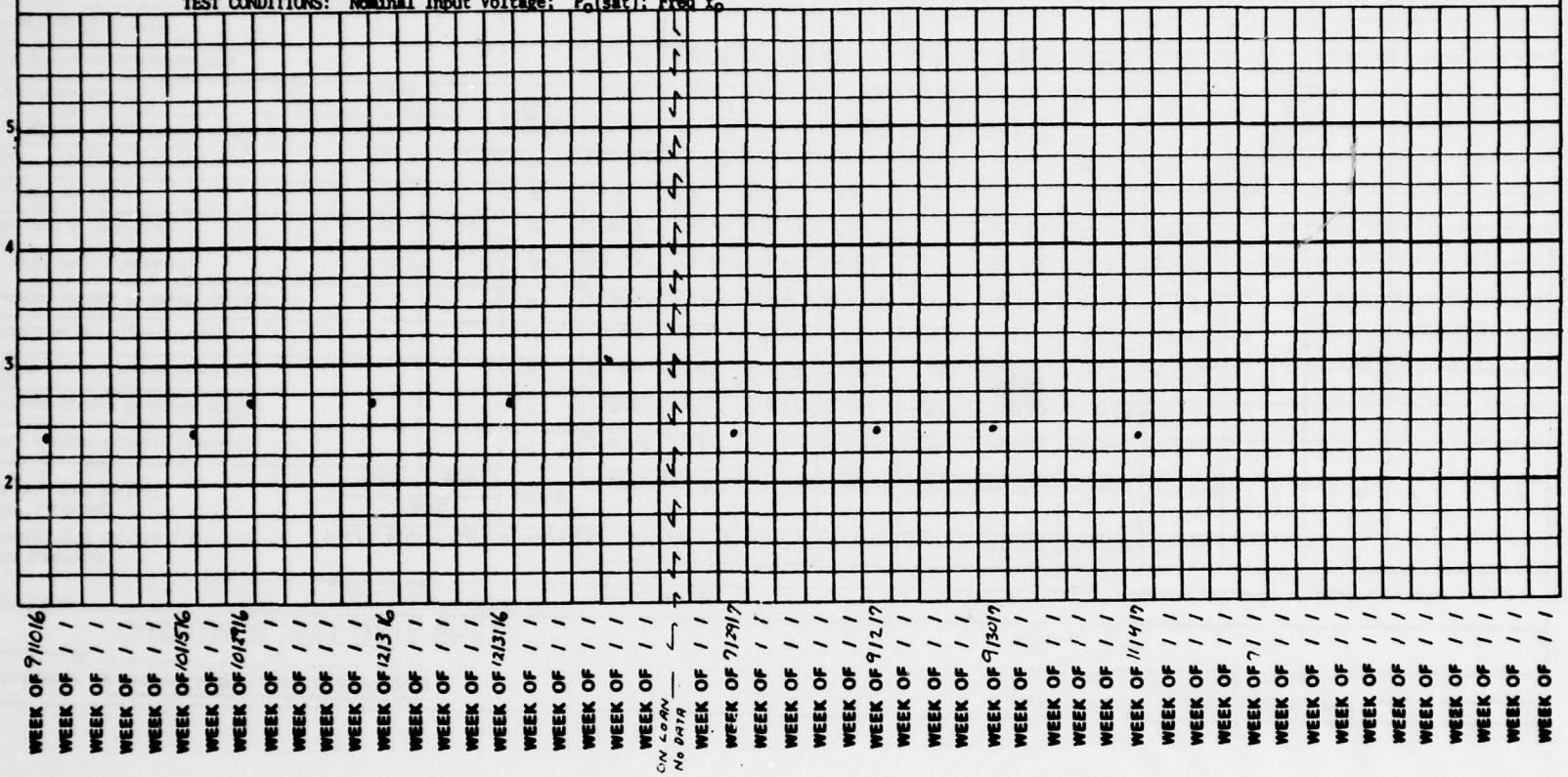
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

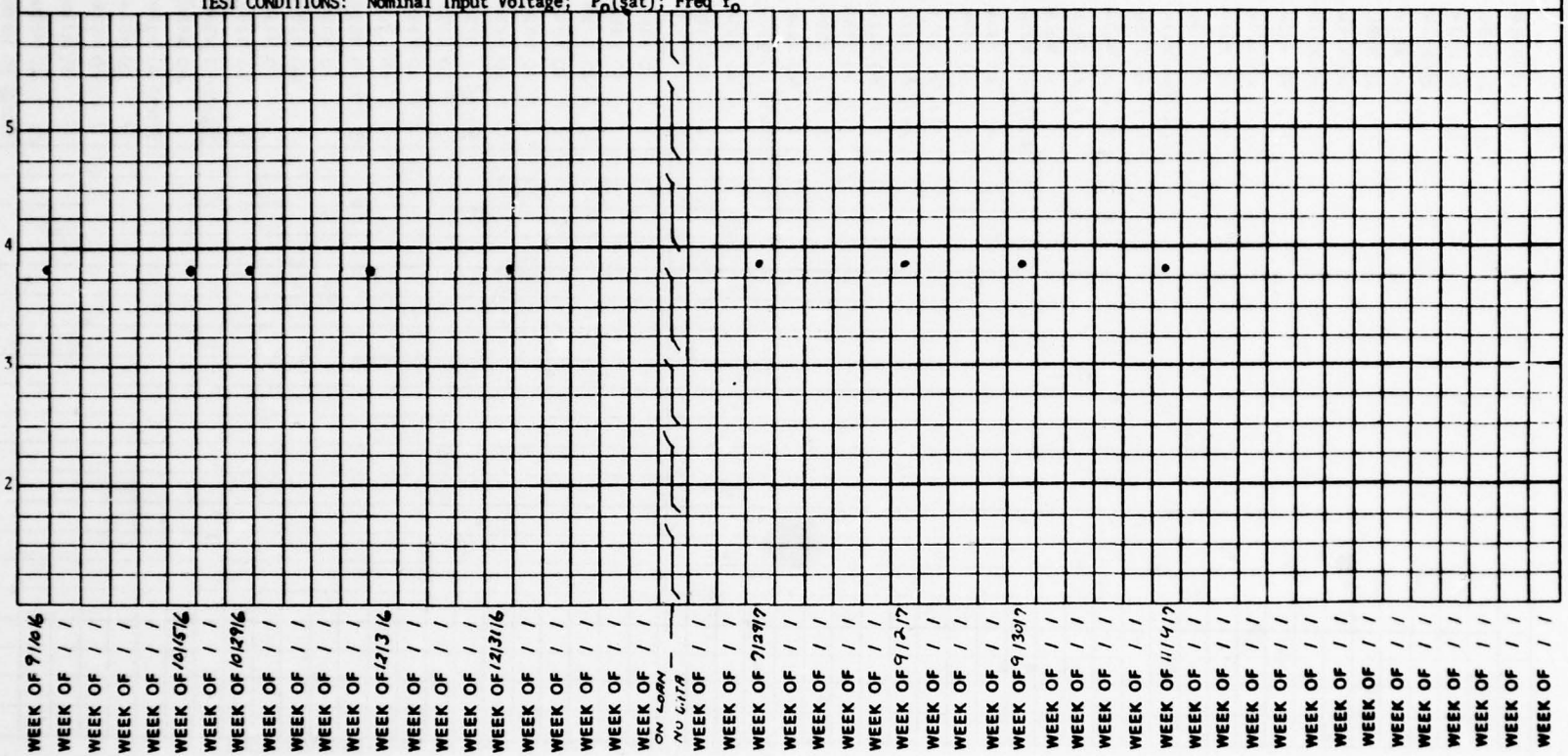
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$


CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)
5
4
3
2
WEEK OF 9/106
WEEK OF
WEEK OF
WEEK OF
WEEK OF
WEEK OF 10/1516
WEEK OF
WEEK OF 10/2916
WEEK OF
WEEK OF
WEEK OF
WEEK OF
WEEK OF 12/1316
WEEK OF
WEEK OF
WEEK OF
WEEK OF 12/3116
WEEK OF
WEEK OF
WEEK OF
WEEK OF
WEEK OF
ON LOAN
NO DATA
WEEK OF
WEEK OF
WEEK OF 7/3917
WEEK OF
WEEK OF
WEEK OF
WEEK OF
WEEK OF 9/2417
WEEK OF
WEEK OF
WEEK OF
WEEK OF 9/3017
WEEK OF
WEEK OF
WEEK OF
WEEK OF
WEEK OF

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

# CUSTOMER TEST DATA SHEET

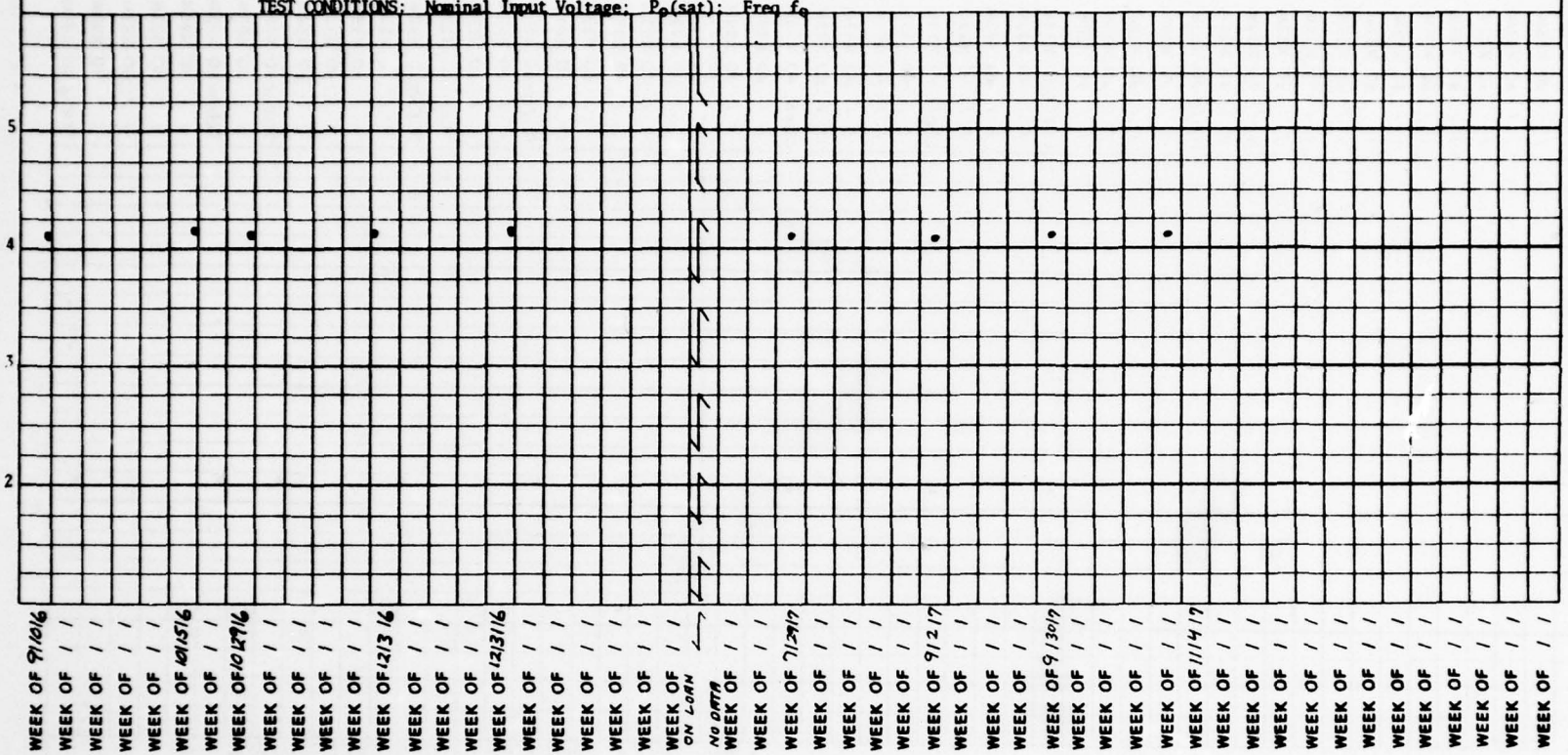
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)




D-144

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. ~~DSP200350-400~~ REV. _____

MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 22-1

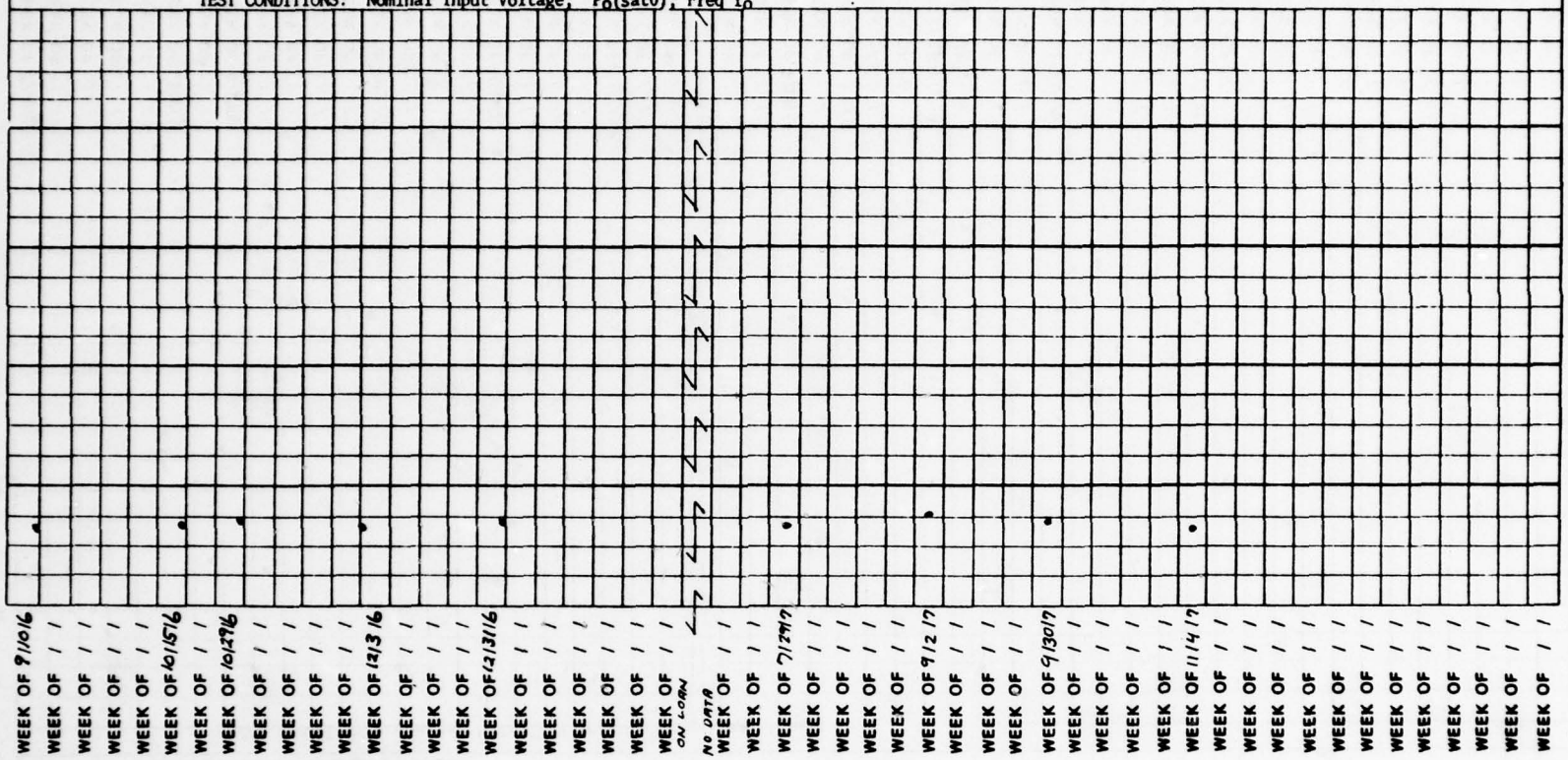
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$




HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

D-145

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___ ___
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

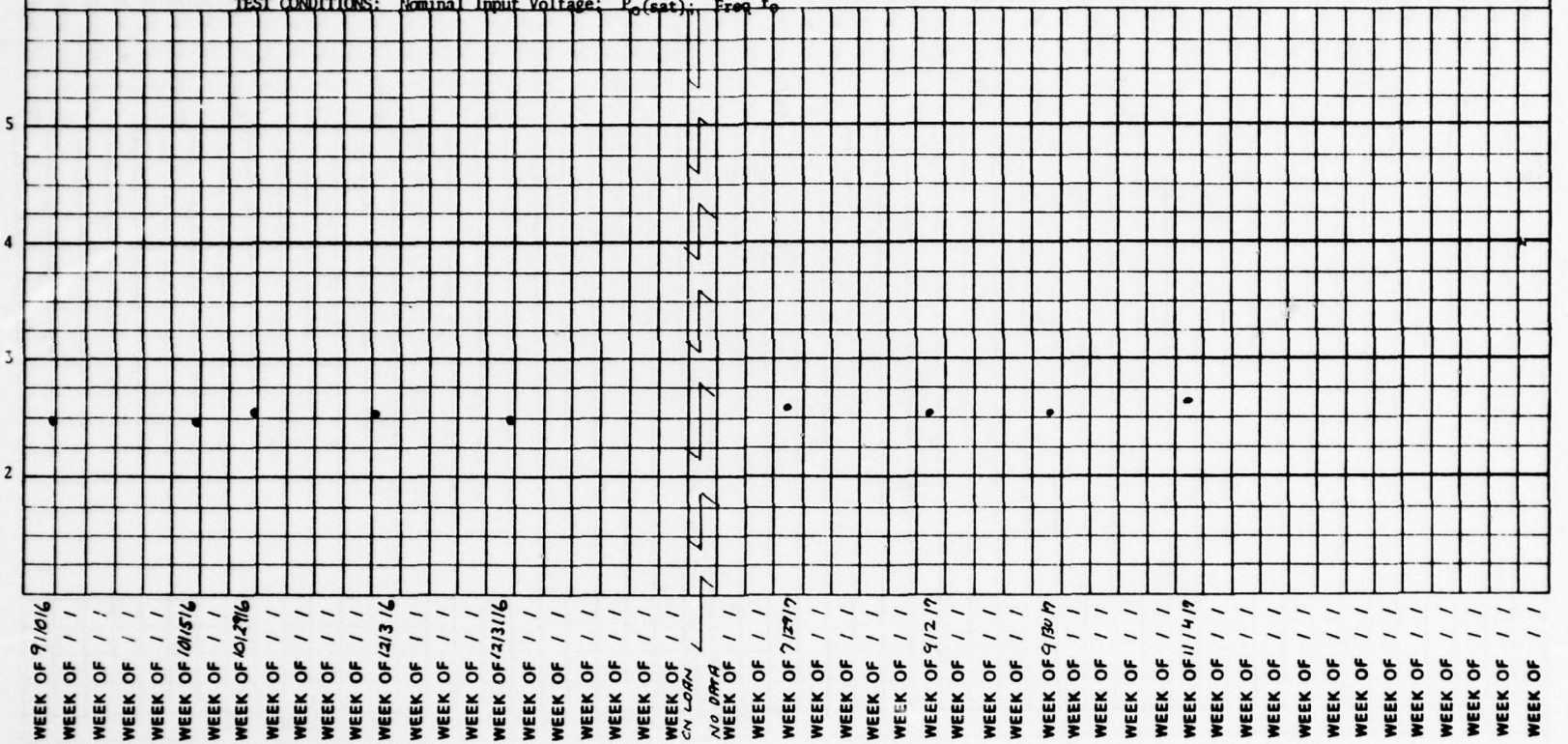
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 22-1

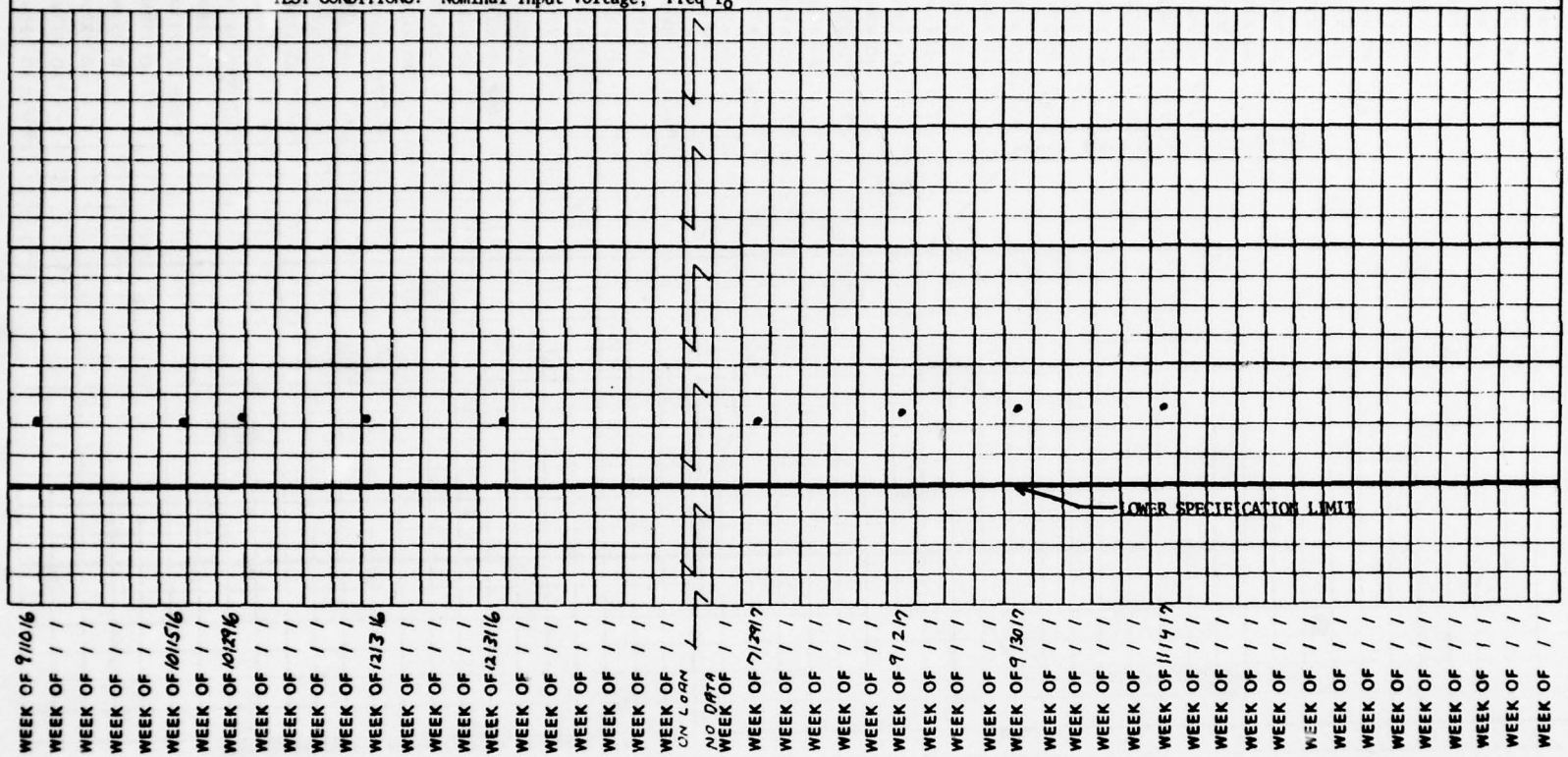
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



AD-A053 739 HUGHES AIRCRAFT CO TORRANCE CALIF ELECTRON DYNAMICS DIV F/G 9/1
DEFENSE SATELLITE COMMUNICATIONS SYSTEM TRAVELING WAVE TUBE AMP--ETC(U)
FEB 78 M L KAHN F04701-74-C-0542
UNCLASSIFIED NL

4 OF 5
AD A053739



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB 200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

# CUSTOMER TEST DATA SHEET

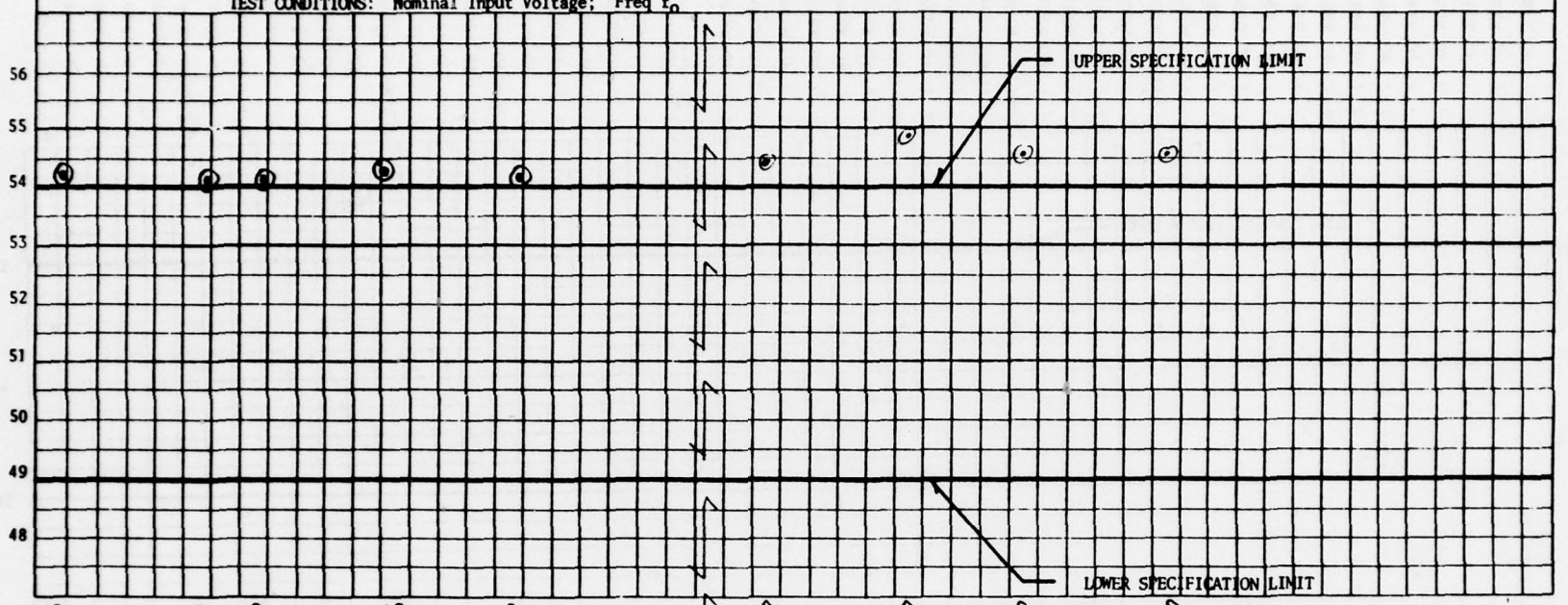
PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




WEEK OF 9/16/6 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF 10/15/6 | WEEK OF / / | WEEK OF 10/29/6 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF 12/3/6 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF 12/31/6 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF ON LOAN | NO DATA | WEEK OF / / | WEEK OF 7/14/7 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF 9/1/7 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF 9/30/7 | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / / | WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

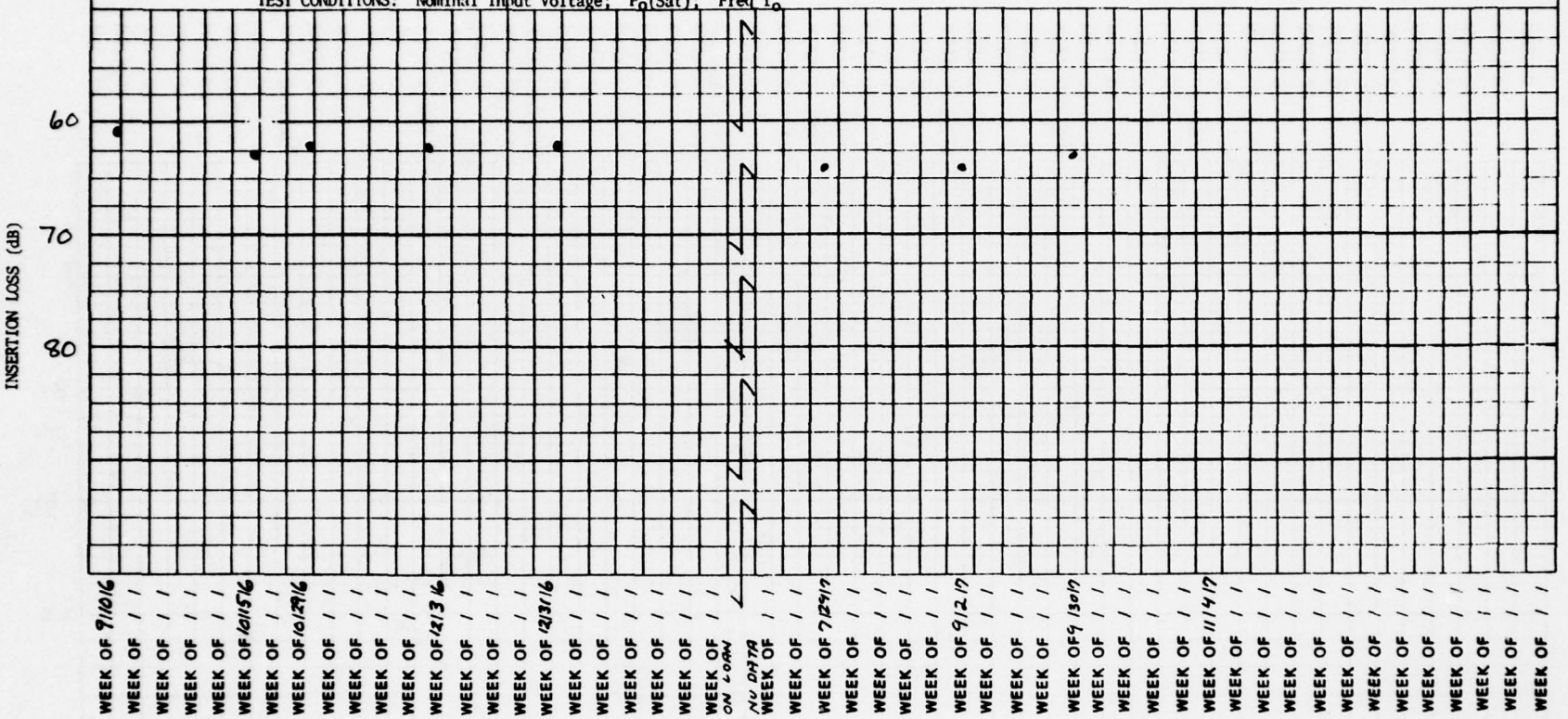
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$




J-149

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

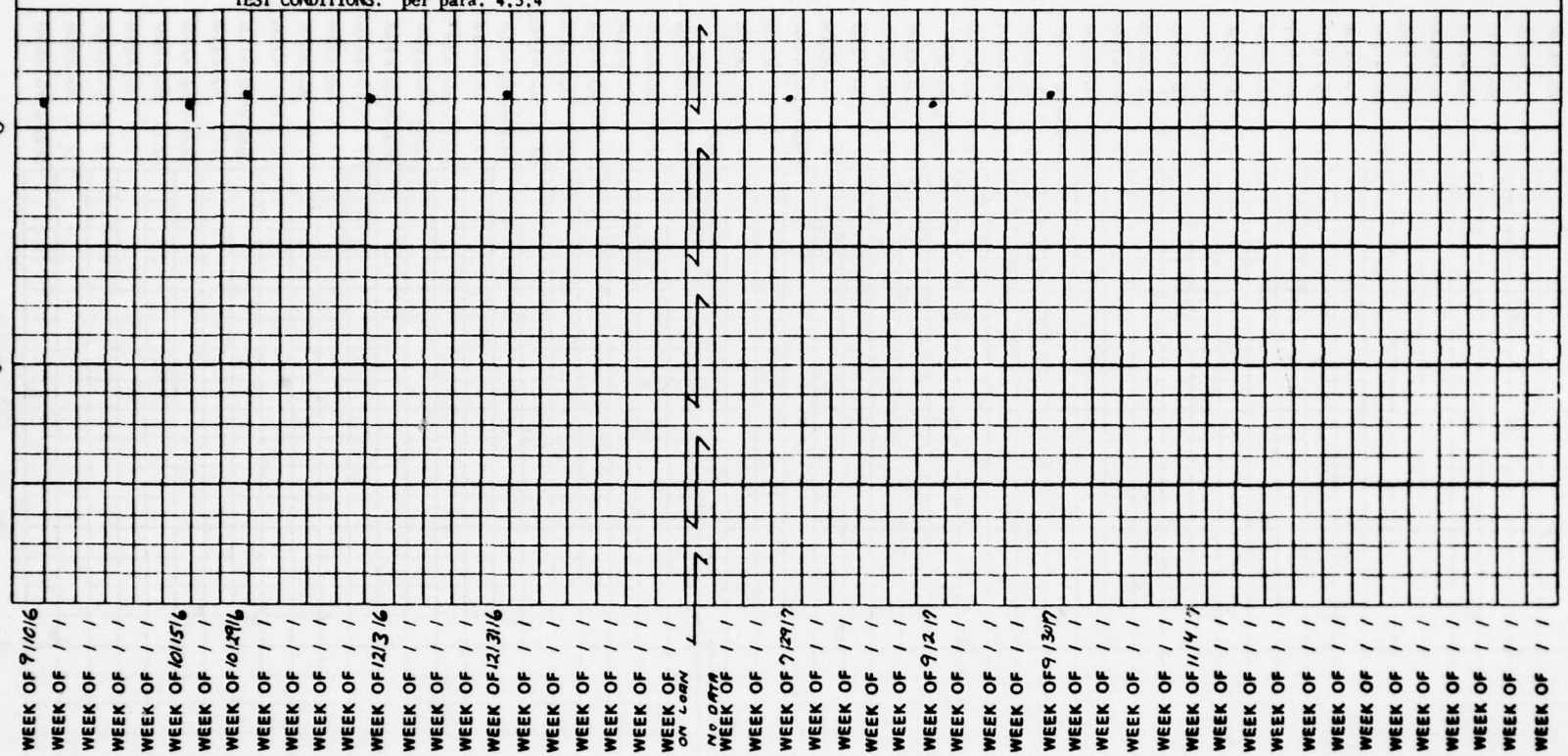
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 |
|---|---|---|---|

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4




OST-0

ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

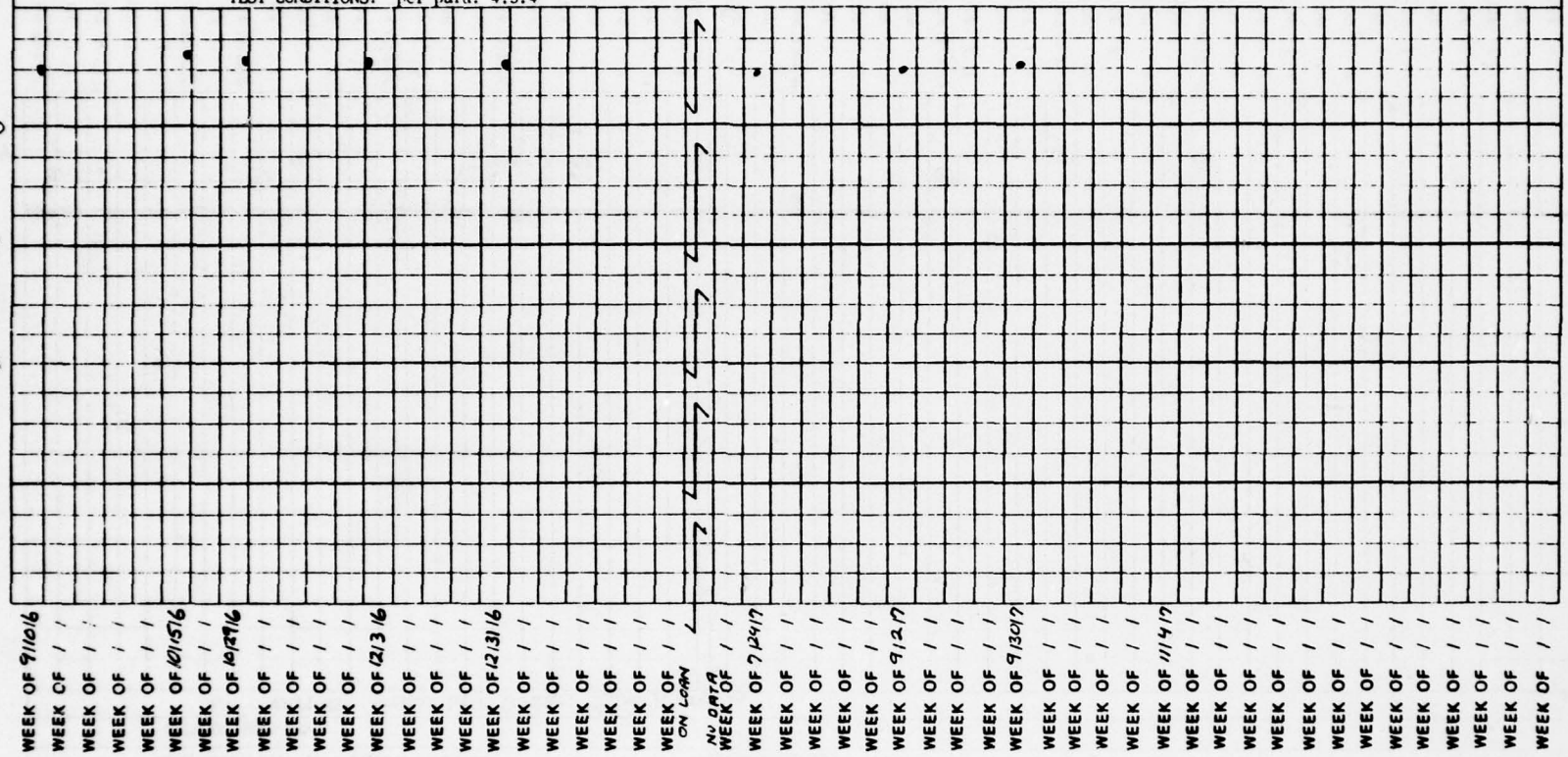
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | SPEC. NO. |
|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | LTPB200350-400 |

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4


20
19
18
WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
ON LOAN
NO DATA
WEEK OF / /
WEEK OF 7/24/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/2/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/30/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. USB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-1

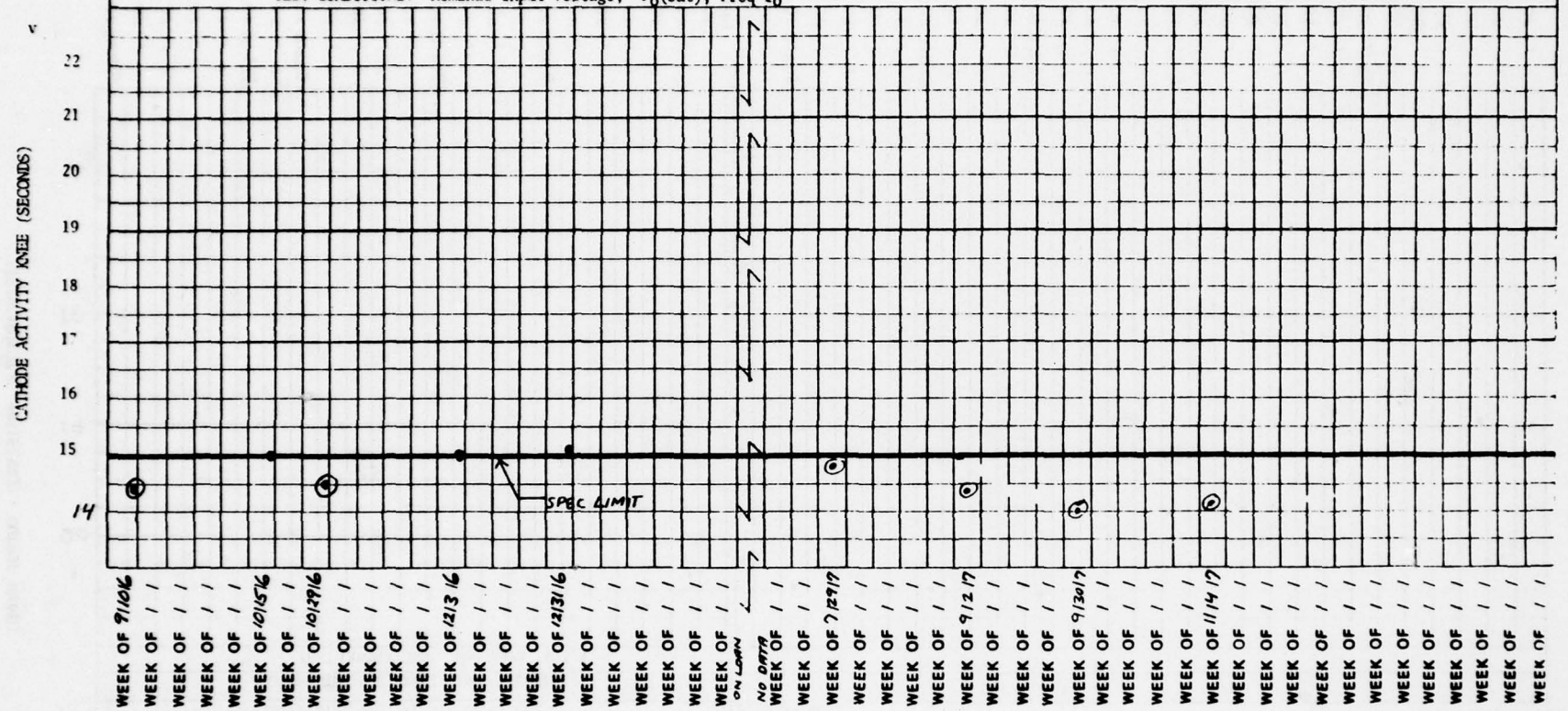
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-123 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: HTPB200350-400
ACCEPTANCE TEST DATA

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | PRE FINAL | FINAL | 6,964 | 13,988 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 4/26/71 | 4/29/71 | 3/16/72 | 1/29/73 | / / | / / | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.231 | 2.249 | 2.187 | 2.177 | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.874 | 3.872 | 3.812 | 3.805 | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.043 | 4.041 | 4.041 | 4.017 | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.609 | 1.660 | 1.494 | 1.399 | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.964 | 3.003 | 2.942 | 2.895 | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.25 | 43.10 | 43.05 | | | | | | | | |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.56# | 54.66# | 54.87# | 54.70# | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | 24.2 | 18.5 | 16.5 | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1. | 1. | 1. | 1. | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. #Gss readings out of specification - High.
Reading high throughout entire test.

TWT has 2529 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE

SPEC: LTPB 200350-400

SERIAL NO. 22-2



| ECRA # | TEST DESIGNATION | SPEC LIMITS | | DATA | | |
|---|---|---|---|---|---|---|
| | | MINIMUM | MAXIMUM | 0 | 13988* | HOURS |
| 4.1 | CATHODE ACTIVITY, SECONDS | 15.0 | | 24.2 | 16.5 | |
| 4.2 | STABILITY | | | ✓ | ✓ | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | |
| 4.4 | INRUSH CURRENT | | | | | |
| a) | INTEGRAL >Iss, t=5msec, ma-sec | | 30 | 10.4 | 14.0 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 2.16 | 3.5 | |
| c) | I >Iss PRIOR TO H.V., AMPS | | 15 | 7.2 | 8.0 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 12.0 | 11.0 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, sec | 60 | 120 | 96 | 93 | |
| f) | I >Iss, t=5msec AFTER H.V., AMPS | | .75 | 0.5 | 0.5 | |
| g) | I WITHIN ±3% Iss @ >100msec | | | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, VSWR | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 1.98 | 1.94 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.33 | 1.53 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.07 | 1.17 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.10 | 1.20 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | |
| | 1) HEPTT CURRENT TLM V | | | | | |
| | 2) CATHODE CURRENT TLM V | | | 2.247 | 2.177 | |
| | 3) HEATER VOLTAGE TLM V | | | 3.892 | 3.805 | |
| | 4) HELIX CURRENT TLM V | | | 4.041 | 4.047 | |
| | 5) CATHODE VOLTAGE TLM V | | | 1.66 | 1.399 | |
| b) | $P_o$ (SAT.), dBm | 43 | | 3.003 | 2.895 | |
| c) | $G_o$ (SAT.), dB | 45 | 48 | 43.25 | 43.05 | |
| | | | | 48.29 | 48.45 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 13989 | HOU |
|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.25 | 43605 | |
| | 2) G (SAT.), dB | 45 | 48 | 48.29 | 48.45 | |
| | 3) I in , AMPS | | | 4.250 | 4.113 | |
| | 4) Pin (DC), WATTS | | 103 | 97.95 | 94.549 | |
| b) | Vin = 33 ±.5V DC | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.25 | 43.05 | |
| | 2) G (SAT.), dB | 45 | 48 | 48.29 | 48.45 | |
| | 3) I in , AMPS | | | 2.988 | 2.894 | |
| | 4) Pin (DC), WATTS | | 103 | 98.604 | 95.502 | |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.23 | ±0.20 | |
| 4.9 | GAIN FLATNESS | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | |
| a) | Gss , dB | 49 | 54 | 54.66 | 54.7 | |
| b) | G (Var), dB | | ±0.35 | ±0.22 | ±0.23 | |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 54.66 | 54.7 | |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.22 | ±0.23 | |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 54.66 | 54.7 | |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.22 | ±0.23 | |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.008 | 0.008 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.008 | 0.008 | |
| b) | Vin = 28 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.008 | 0.008 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.008 | 0.008 | |
| c) | Vin = 33 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.008 | 0.008 | |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.008 | 0.008 | |
| 4.12 | NOISE FIGURE | | | | | |
| a) | N.F., dB | | 33 | 28.5 | 28.0 | |

S/N_____



| C A # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 13989 | | HOURS |
|---|---|---|---|---|---|---|---|
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 9.7 | 10.2 | | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 21.4 | 24.0 | | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 27.6 | 31.0 | | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 27.5/30 | 32.9/30 | | |
| 4.15 | AM/PM CONVERSION | | | | | | |
| | $\frac{\Delta\phi}{\Delta P_{i(rl)}}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.6 | 1.9 | | |
| b) | at 0dB | | 3.5 | 1.9 | 2.1 | | |
| c) | at -2dB | | 3.5 | 2.1 | 2.1 | | |
| d) | at -3dB | | 3.5 | 2.2 | 2.1 | | |
| e) | at -4dB | | 3.5 | 2.2 | 2.2 | | |
| f) | at -5dB | | 3.5 | 2.2 | 2.3 | | |
| g) | at -6dB | | 3.5 | 1.9 | 2.1 | | |
| h) | at -7dB | | 3.5 | 1.8 | 1.9 | | |
| i) | at -8dB | | 3.5 | 1.6 | 1.7 | | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHZ LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.01 | 0.01 | | |
| b) | T.D. PARAPOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 16.5 | 16.0 | | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | | |

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 88 | 417 | 825 | 917 | 1239 | 1479 | 1652 | 1756 | 1895 | 2250 | 2535 | 2586 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 5/23/71 | week of 6/7/71 | week of 6/24/71 | week of 7/2/71 | week of 7/14/71 | week of 7/24/71 | week of 7/31/71 | week of 8/5/71 | week of 8/11/71 | week of 8/26/71 | week of 9/7/71 | week of 9/10/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.224 | 2.227 | 2.223 | 2.224 | 2.223 | 2.210 | 2.233 | 2.202 | 2.203 | 2.192 | 2.224 | 2.209 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.847 | 3.851 | 3.847 | 3.848 | 3.848 | 3.839 | 3.846 | 3.839 | 3.844 | 3.841 | 3.829 | 3.837 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.050 | 4.038 | 4.041 | 4.039 | 4.038 | 4.048 | 4.037 | 4.042 | 4.047 | 4.041 | 4.025 | 4.050 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.607 | 1.579 | 1.611 | 1.761 | 1.747 | 1.430 | 1.398 | 1.414 | 1.418 | 1.450 | 1.449 | 1.471 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.984 | 2.979 | 2.982 | 3.001 | 3.017 | 2.905 | 3.012 | 2.957 | 2.920 | 2.975 | 3.102 | 2.892 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.35 | 43.35 | 43.35 | 43.35 | 43.30 | 43.30 | 43.35 | 43.30 | 43.40 | 43.55 | 43.45 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.46* | 54.40 | 54.36 | 54.35 | 54.46 | 54.50 | 54.38 | 54.60 | 54.66 | 54.64 | 54.45 | 54.71 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | 22.0 | | 22.3 | | | | | | 21.0 |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | 7/21/71 | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1. | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1 * $G_{SS}$ reading is out of specification throughout entire test.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W LOMITA BLVD TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(BAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 2727 | 2894 | 3089 | 3256 | 3397 | 3567 | 3704 | 3897 | 4064 | 4260 | 4382 | 4542 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 9/16/71 | week of 9/23/71 | week of 10/1/71 | week of 10/8/71 | week of 10/14/71 | week of 10/21/71 | week of 10/27/71 | week of 11/4/71 | week of 11/11/71 | week of 11/19/71 | week of 11/24/71 | week of 12/1/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.296 | 2.189 | 2.263 | 2.191 | 2.226 | 2.213 | 2.241 | 2.227 | 2.223 | 2.217 | 2.203 | 2.231 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.837 | 3.839 | 3.831 | 3.837 | 3.835 | 3.834 | 3.830 | 3.835 | 3.824 | 3.830 | 3.827 | 3.822 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.048 | 4.039 | 4.064 | 4.041 | 4.040 | 4.044 | 4.053 | 4.040 | 4.049 | 4.037 | 4.044 | 4.048 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.480 | 1.442 | 1.700 | 1.468 | 1.840 | 1.555 | 1.786 | 1.836 | 1.490 | 1.561 | 1.557 | 1.792 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.923 | 2.995 | 2.754 | 2.975 | 3.006 | 2.967 | 2.891 | 3.000 | 2.900 | 3.000 | 2.950 | 2.907 |
| $P_o$ (BAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.40 | 43.45 | 43.50 | 43.45 | 43.50 | 43.50 | 43.40 | 43.35 | 43.35 | 43.35 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.63 | 54.61 | 54.70 | 54.60 | 54.51 | 54.50 | 54.50 | 54.50 | 54.66 | 54.50 | 54.50 | 54.70 |
| $L_i$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | 11/2/71 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 4759 week of 12/10/71 | 4932 week of 12/17/71 | 4996 week of 12/22/71 | 5184 week of 12/30/71 | 5357 week of 1/6/72 | 5525 week of 1/13/72 | 5714 week of 1/22/72 | 5880 week of 1/28/72 | 6052 week of 2/4/72 | 6218 week of 2/11/72 | 6364 week of 2/17/72 | 6528 week of 2/24/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.221 | 2.195 | 2.222 | 2.234 | 2.229 | 2.23 | 2.23 | 2.23 | 2.23 | 2.23 | 2.23 | 2.23 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.829 | 3.823 | 3.831 | 3.820 | 3.818 | 3.821 | 3.82 | 3.82 | 3.82 | 3.81 | 3.82 | 3.81 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.040 | 4.045 | 4.044 | 4.050 | 4.050 | 4.044 | 4.05 | 4.05 | 4.05 | 4.05 | 4.05 | 4.06 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.561 | 1.541 | 1.551 | 1.776 | 1.77 | 1.80 | 1.80 | 1.77 | 1.79 | 1.75 | 1.77 | 1.66 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.949 | 2.948 | 2.890 | 2.894 | 2.890 | 2.90 | 2.89 | 2.89 | 2.89 | 2.88 | 2.89 | 2.81 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.45 | 43.45 | 43.40 | 43.40 | 43.40 | 43.50 | 43.40 | 43.40 | 43.40 | 43.40 | 43.40 |
| Gm FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.50 | 54.40 | 54.50 | 54.60 | 54.60 | 54.50 | 54.50 | 54.60 | 54.60 | 54.75 | 54.70 | 54.75 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | 1/26/72 | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-151 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 6694 | 6839 | 6970 | 7112 | 7273 | 7395 | 7634 | 7785 | 7975 | 8144 | 8282 | 8479 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 3/3/72 | week of 3/9/72 | week of 3/17/72 | week of 3/23/72 | week of 3/30/72 | week of 4/7/72 | week of 4/21/72 | week of 4/27/72 | week of 5/5/72 | week of 5/12/72 | week of 5/18/72 | week of 5/26/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.23 | 2.20 | 2.20 | 2.19 | 2.20 | 2.18 | 2.19 | 2.20 | 2.20 | 2.20 | 2.20 | 2.20 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.81 | 3.82 | 3.81 | 3.81 | 3.82 | 3.81 | 3.81 | 3.81 | 3.82 | 3-81 | 3.81 | 3.82 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.06 | 4.05 | 4.05 | 4.05 | 4.05 | 4.05 | 4.05 | 4.04 | 4.05 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.70 | 1.53 | 1.66 | 1.50 | 1.53 | 1.40 | 1.50 | 1.64 | 1.40 | 1.61 | 1.64 | 1.61 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.89 | 2.91 | 2.89 | 2.91 | 2.90 | 2.89 | 2.89 | 2.90 | 2.89 | 2.94 | 2.89 | 2.90 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.40 | 43.20 | 43.15 | 43.15 | 43.10 | 43.15 | 43.10 | 43.20 | 43.20 | 43.30 | 43.30 | 43.35 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 54.70 | 54.65 | 54.70 | 54.80 | 54.70 | 54.55 | 54.50 | 54.50 | 54.50 | 54.80 | 54.70 | 54.80 |
| $L_i$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | 4/19/72 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-125 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 8640 | 8808 | 8982 | 9148 | 9315 | 9483 | 9645 | 9776 | 9938 | 10106 | 10263 | 10429 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 6/2/72 | week of 6/9/72 | week of 6/16/72 | week of 6/23/72 | week of 6/30/72 | week of 7/7/72 | week of 7/14/72 | week of 7/21/72 | week of 7/28/72 | week of 8/4/72 | week of 8/11/72 | week of 8/18/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.21 | 2.20 | 2.20 | 2.20 | 2.20 | 2.20 | 2.19 | 2.20 | 2.19 | 2.19 | 2.19 | 2.19 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.81 | 3.81 | 3.81 | 3.82 | 3.80 | 3.81 | 3.80 | 3.81 | 3.81 | 3.81 | 3.81 | 3.80 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.04 | 4.04 | 4.04 | 4.05 | 4.04 | 4.04 | 4.04 | 4.04 | 4.03 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.67 | 1.70 | 1.74 | 1.74 | 1.72 | 1.66 | 1.60 | 1.64 | 1.65 | 1.73 | 1.65 | 1.66 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.94 | 2.98 | 2.99 | 3.00 | 3.02 | 2.98 | 2.95 | 3.00 | 3.04 | 3.01 | 3.00 | 3.01 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.20 | 43.25 | 43.20 | 43.20 | 43.20 | 43.30 | 43.20 | 43.25 | 43.20 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 51 | db | 54.70 | 54.70 | 54.80 | 54.70 | 54.70 | 54.90 | 54.60 | 54.70 | 54.80 | 54.70 | 54.80 | 54.70 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 22-2
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# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(BAT); FREQ. $f_o$
TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| TOTAL ACCUMULATED HOURS | LIMITS MIN | LIMITS MAX | UNITS | 10573 | 10642 | 10727 | 10892 | 11055 | 11217 | 11389 | 11551 | 11718 | 11880 | 12048 | 12218 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 8/28/72 | week of 8/31/72 | week of 9/8/72 | week of 9/15/72 | week of 9/22/72 | week of 9/29/72 | week of 10/6/72 | week of 10/13/72 | week of 10/20/72 | week of 10/27/72 | week of 11/3/72 | week of 11/10/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.20 | 2.19 | 2.20 | 2.20 | 2.19 | 2.20 | 2.19 | 2.19 | 2.19 | 2.19 | 2.19 | 2.20 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.80 | 3.81 | 3.81 | 3.80 | 3.81 | 3.80 | 3.81 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.04 | 4.04 | 4.04 | 4.04 | 4.03 | 4.05 | 4.04 | 4.03 | 4.04 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.68 | 1.66 | 1.75 | 1.78 | 1.77 | 1.68 | 1.66 | 1.70 | 1.63 | 1.73 | 1.71 | 1.68 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.94 | 3.00 | 3.01 | 3.00 | 3.05 | 2.91 | 3.00 | 3.00 | 2.96 | 3.00 | 2.96 | 2.93 |
| $P_o$ (BAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.15 | 43.20 | 43.20 | 43.25 | 43.15 | 43.15 | 43.20 | 43.15 | 43.20 | 43.25 | 43.15 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.70 | 54.80 | 54.70 | 54.80 | 54.70 | 54.70 | 54.70 | 54.80 | 54.80 | 54.70 | 54.70 | 54.80 |
| $L_I$ INSERTION LOSS | | | db | | 73.70 | | | 73.30 | | | 73.00 | | | 74.50 | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 18.24 | | | 18.22 | | | 18.26 | | | 18.34 | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 18.12 | | | 18.12 | | | 18.16 | | | 18.20 | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | 9/8/72 | | | 9/29/72 | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | 1. | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. Rain reading intermittent

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 12386 week of 11/17/72 | 12494 week of 11/22/72 | 12706 week of 12/1/72 | 12870 week of 12/8/72 | 13036 week of 12/15/72 | 13176 week of 12/21/72 | 13258 week of 12/29/72 | 13419 week of 1/5/73 | 13581 week of 1/12/73 | 13755 week of 1/19/73 | 13988 week of 1/29/73 | 14030 week of 2/2/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.19 | 2.19 | 2.19 | 2.20 | 2.20 | 2.20 | 2.19 | 2.20 | 2.18 | 2.19 | 2.17 | 2.17 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.04 | 4.03 | 4.03 | 4.05 | 4.04 | 4.04 | 4.05 | 4.04 | 4.04 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.70 | 1.72 | 1.68 | 1.65 | 1.61 | 1.66 | 1.57 | 1.61 | 1.61 | 1.61 | 1.45 | 1.56 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.94 | 3.02 | 3.02 | 2.91 | 2.93 | 2.95 | 2.92 | 2.92 | 2.98 | 2.93 | 3.00 | 3.00 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.10 | 43.10 | 43.10 | 43.10 | 43.15 | 43.10 | 43.10 | 43.10 | 43.10 | 43.10 | 43.10 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.70 | 54.70 | 54.70 | 54.90 | 54.70 | 54.70 | 54.80 | 54.70 | 54.70 | 54.60 | 54.70 | 54.80 |
| $L_L$ INSERTION LOSS | | | db | | 72.2 | | | 74.2 | | | 73.30 | | | 71.50 | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 19.0 | | | 18.30 | | | 18.92 | | | 18.68 | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 18.26 | | | 18.25 | | | 18.37 | | | 18.48 | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | 16.5 | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 1/12/73 | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | 1. | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. Rain reading intermittent

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT): FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 14201 week of 2/9/73 | 14362 week of 2/16/73 | 14530 week of 2/23/73 | 14690 week of 3/2/73 | 14881 week of 3/10/73 | 15029 week of 3/16/73 | 15197 week of 3/23/73 | 15357 week of 3/30/73 | 15530 week of 4/6/73 | 15698 week of 4/13/73 | 15865 week of 4/20/73 | 16011 week of 4/27/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.18 | 2.18 | 2.19 | 2.19 | 2.19 | 2.19 | 2.19 | 2.20 | 2.19 | 2.20 | 2.20 | 2.20 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 | 3.79 | 3.80 | 3.80 | 3.80 | 3.79 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.03 | 4.04 | 4.04 | 4.03 | 4.04 | 4.04 | 4.04 | 4.05 | 4.04 | 4.04 | 4.04 | 4.04 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.64 | 1.61 | 1.70 | 1.71 | 1.72 | 1.74 | 1.73 | 1.67 | 1.66 | 1.71 | 1.70 | 1.79 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 3.05 | 3.00 | 3.01 | 3.06 | 3.00 | 3.00 | 3.00 | 2.88 | 2.89 | 2.98 | 2.96 | 3.01 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.20 | 43.20 | 43.05 | 43.10 | 43.10 | 43.10 | 43.05 | 43.10 | 43.05 | 43.00 | 43.00 | 43.05 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.80 | 54.70 | 54.60 | 54.70 | 54.80 | 54.80 | 54.90 | 54.80 | 54.80 | 55.00 | 55.00 | 54.90 |
| $I_L$ INSERTION LOSS | | | db | | 71.40 | | | | | | 71.70 | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 19.13 | | | | | | 19.45 | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 18.42 | | | | | | 18.49 | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | 4/4/73 | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

1. Rain reading intermittent

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

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TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 16157 week of 5/4/73 | 16323 week of 5/11/73 | 16485 week of 5/18/73 | 16658 week of 5/25/73 | 16820 week of 6/1/73 | 16996 week of 6/9/73 | 17135 week of 6/15/73 | 17302 week of 6/22/73 | 17448 week of 6/29/73 | 17614 week of 7/6/73 | 17783 week of 7/13/73 | / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.20 | 2.20 | 2.19 | 2.20 | 2.19 | 2.21 | 2.19 | 2.20 | 2.21 | 2.18 | 2.20 | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.80 | 3.80 | 3.78 | 3.80 | 3.79 | 3.79 | 3.79 | 3.79 | 3.79 | 3.79 | 3.79 | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.04 | 4.04 | 4.03 | 4.04 | 4.03 | 4.05 | 4.04 | 4.04 | 4.04 | 4.04 | 4.05 | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 1.79 | 1.77 | 1.72 | 1.80 | 1.74 | 1.71 | 1.71 | 1.73 | 1.90 | 1.69 | 1.71 | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 3.01 | 3.01 | 2.97 | 3.00 | 3.01 | 2.90 | 2.97 | 2.99 | 3.01 | 2.99 | 2.89 | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.10 | 43.20 | 43.25 | 43.20 | 43.25 | 43.15 | 43.20 | 43.20 | 43.20 | 43.30 | 43.20 | |
| $G_{ss}$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.90 | 55.20 | 55.20 | 55.20 | 55.20 | 55.10 | 55.20 | 55.10 | 55.20 | 55.30 | 55.20 | |
| $I_L$ INSERTION LOSS | | | db | | 72.6 | | | | | | 70.5 | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | 20.30 | | | | | | 19.98 | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | 18.58 | | | | | | 18.62 | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

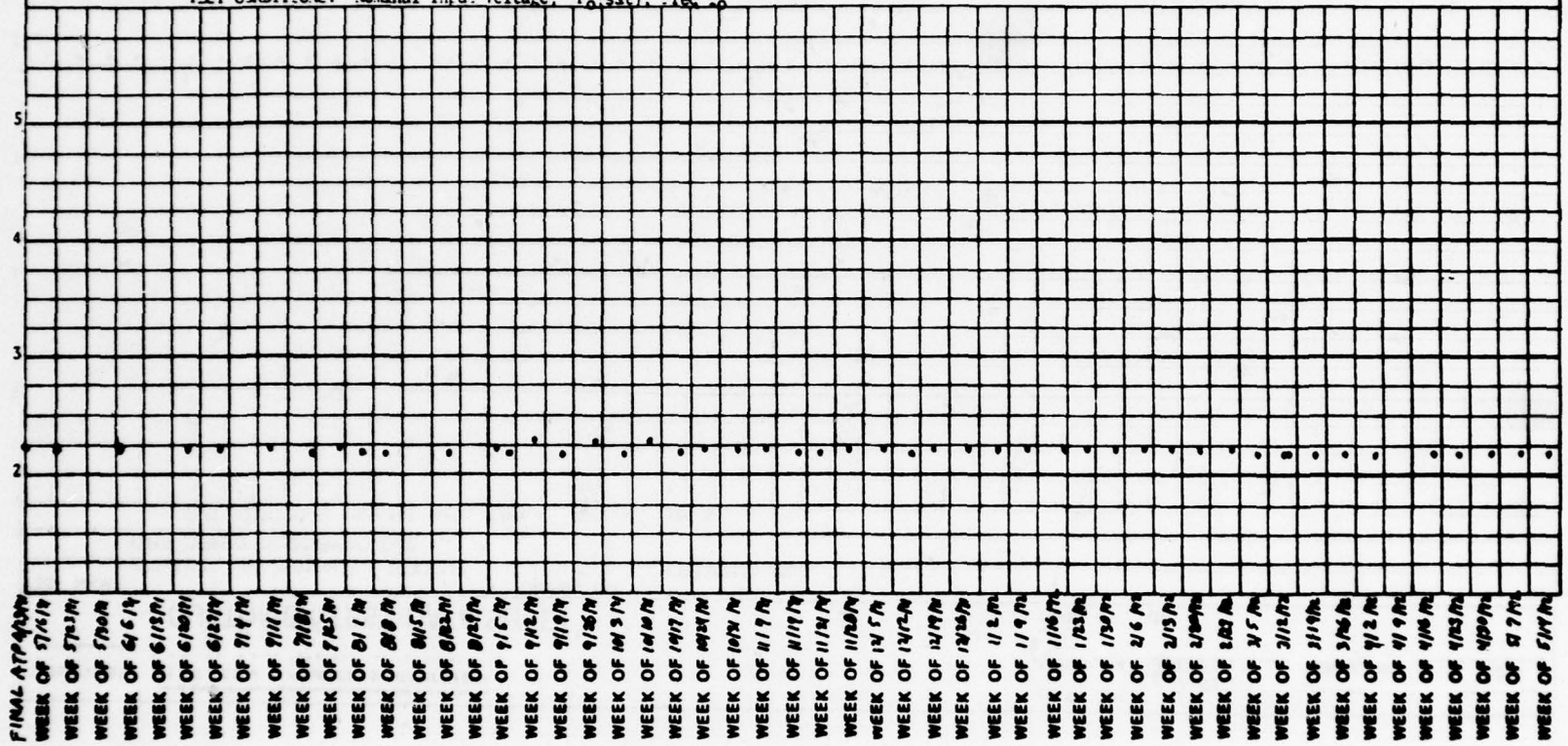
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

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TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

INPUT CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 5/24/81
WEEK OF 5/31/81
WEEK OF 6/7/81
WEEK OF 6/14/81
WEEK OF 6/21/81
WEEK OF 6/28/81
WEEK OF 7/5/81
WEEK OF 7/12/81
WEEK OF 7/19/81
WEEK OF 7/26/81
WEEK OF 8/2/81
WEEK OF 8/9/81
WEEK OF 8/16/81
WEEK OF 8/23/81
WEEK OF 8/30/81
WEEK OF 9/6/81
WEEK OF 9/13/81
WEEK OF 9/20/81
WEEK OF 9/27/81
WEEK OF 10/4/81
WEEK OF 10/11/81
WEEK OF 10/18/81
WEEK OF 10/25/81
WEEK OF 11/1/81
WEEK OF 11/8/81
WEEK OF 11/15/81
WEEK OF 11/22/81
WEEK OF 11/29/81
WEEK OF 12/6/81
WEEK OF 12/13/81
WEEK OF 12/20/81
WEEK OF 12/27/81
WEEK OF 1/3/82
WEEK OF 1/10/82
WEEK OF 1/17/82
WEEK OF 1/24/82
WEEK OF 1/31/82
WEEK OF 2/7/82
WEEK OF 2/14/82
WEEK OF 2/21/82
WEEK OF 2/28/82
WEEK OF 3/7/82
WEEK OF 3/14/82
WEEK OF 3/21/82
WEEK OF 3/28/82
WEEK OF 4/4/82
WEEK OF 4/11/82
WEEK OF 4/18/82
WEEK OF 4/25/82
WEEK OF 5/2/82
WEEK OF 5/9/82
WEEK OF 5/16/82
WEEK OF 5/23/82
WEEK OF 5/30/82

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

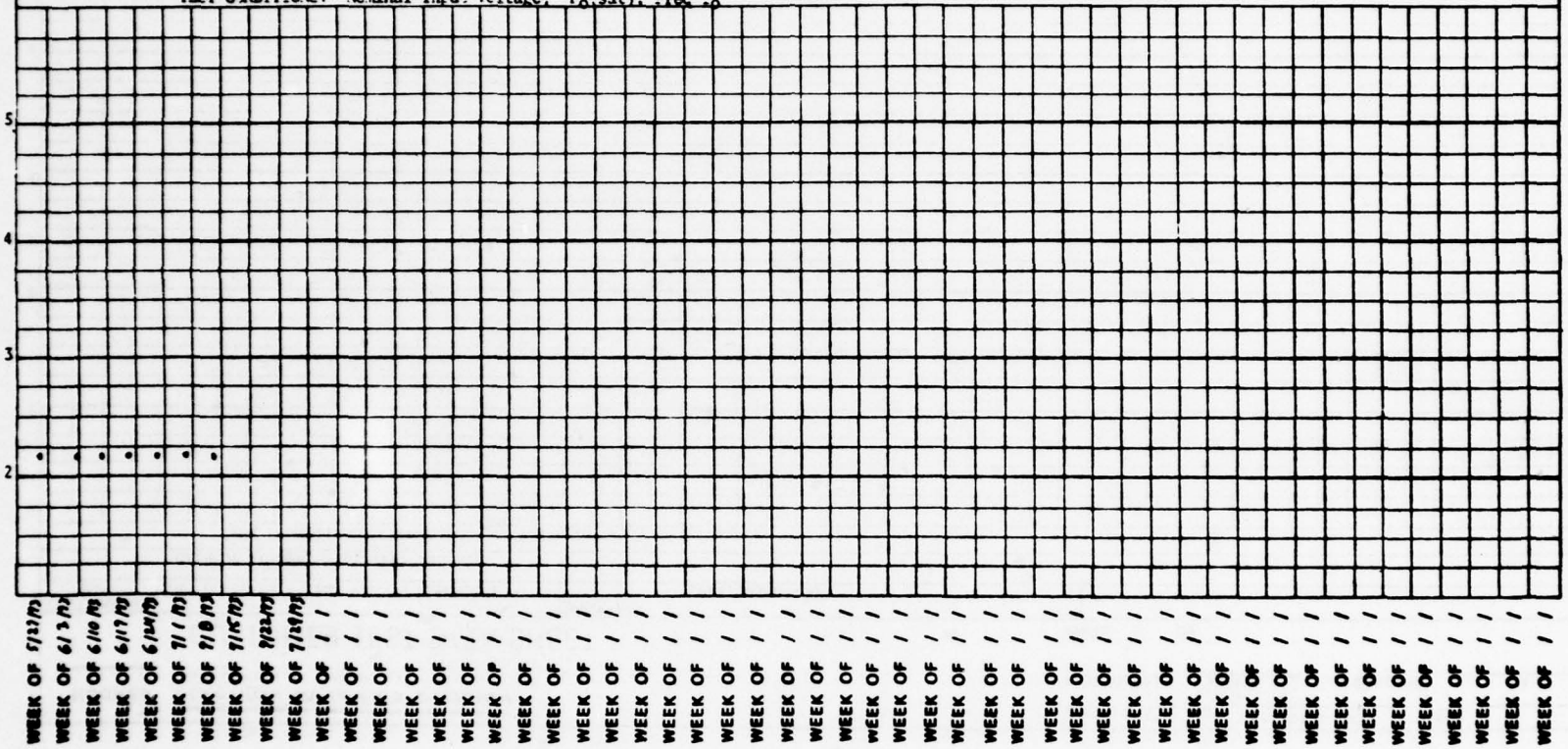
# CUSTOMER TEST DATA SHEET

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TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

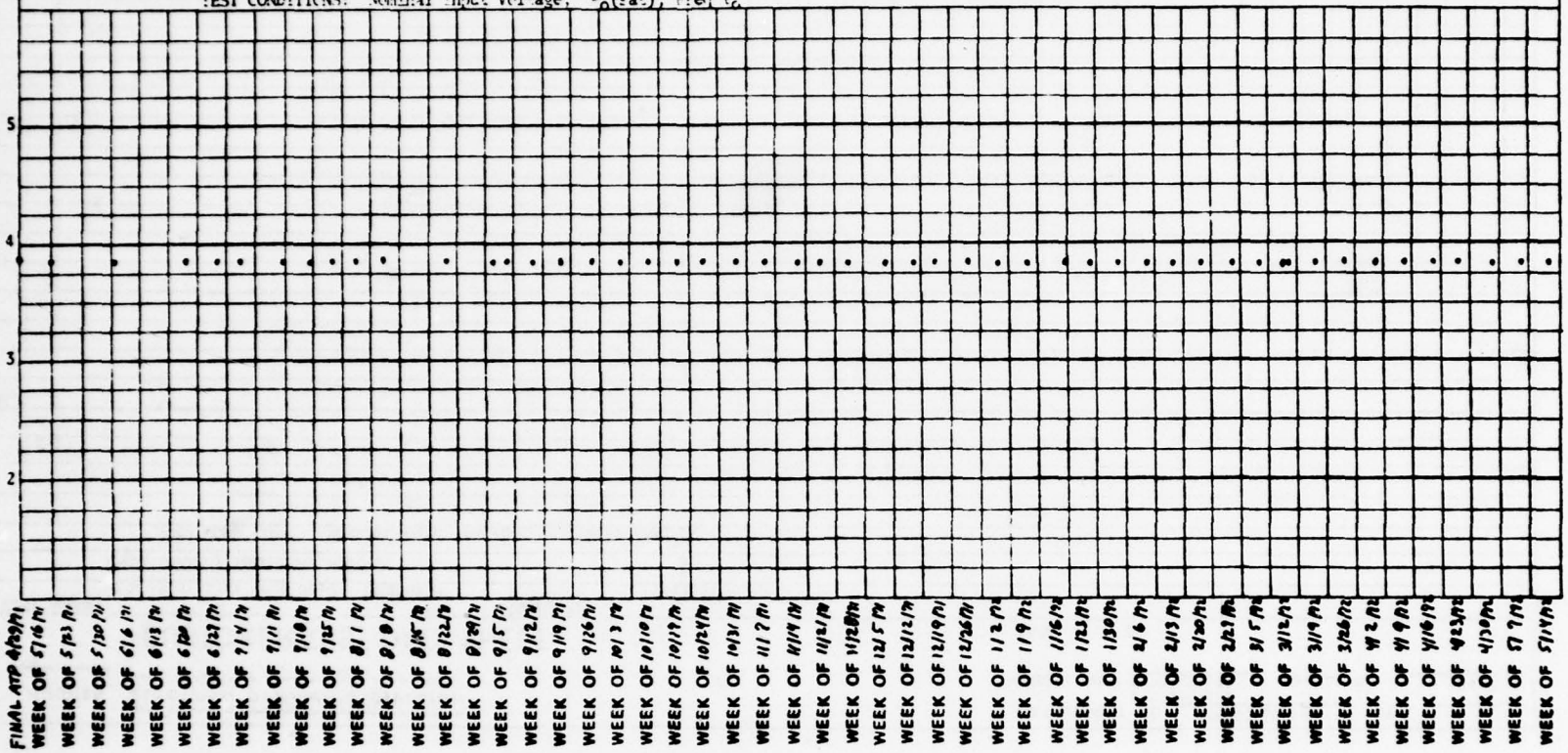
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TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 SERIAL NO. 88-8

# CUSTOMER TEST DATA SHEET

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TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 5/14/79
WEEK OF 5/7/79
WEEK OF 4/30/79
WEEK OF 4/23/79
WEEK OF 4/16/79
WEEK OF 4/9/79
WEEK OF 4/2/79
WEEK OF 3/26/79
WEEK OF 3/19/79
WEEK OF 3/12/79
WEEK OF 3/5/79
WEEK OF 2/26/79
WEEK OF 2/19/79
WEEK OF 2/12/79
WEEK OF 2/5/79
WEEK OF 1/29/79
WEEK OF 1/22/79
WEEK OF 1/15/79
WEEK OF 1/8/79
WEEK OF 12/31/78
WEEK OF 12/24/78
WEEK OF 12/17/78
WEEK OF 12/10/78
WEEK OF 12/3/78
WEEK OF 11/26/78
WEEK OF 11/19/78
WEEK OF 11/12/78
WEEK OF 11/5/78
WEEK OF 10/29/78
WEEK OF 10/22/78
WEEK OF 10/15/78
WEEK OF 10/8/78
WEEK OF 10/1/78
WEEK OF 9/24/78
WEEK OF 9/17/78
WEEK OF 9/10/78
WEEK OF 9/3/78
WEEK OF 8/27/78
WEEK OF 8/20/78
WEEK OF 8/13/78
WEEK OF 8/6/78
WEEK OF 7/30/78
WEEK OF 7/23/78
WEEK OF 7/16/78
WEEK OF 7/9/78
WEEK OF 7/2/78
WEEK OF 6/25/78
WEEK OF 6/18/78
WEEK OF 6/11/78
WEEK OF 6/4/78
WEEK OF 5/28/78
WEEK OF 5/21/78

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 28-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)

5

4

3

2

WEEK OF 5/27/73 WEEK OF 6/3/73 WEEK OF 6/10/73 WEEK OF 6/17/73 WEEK OF 6/24/73 WEEK OF 7/1/73 WEEK OF 7/8/73 WEEK OF 7/15/73 WEEK OF 7/22/73 WEEK OF 7/29/73 WEEK OF / / WEEK OF / / WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 28-2

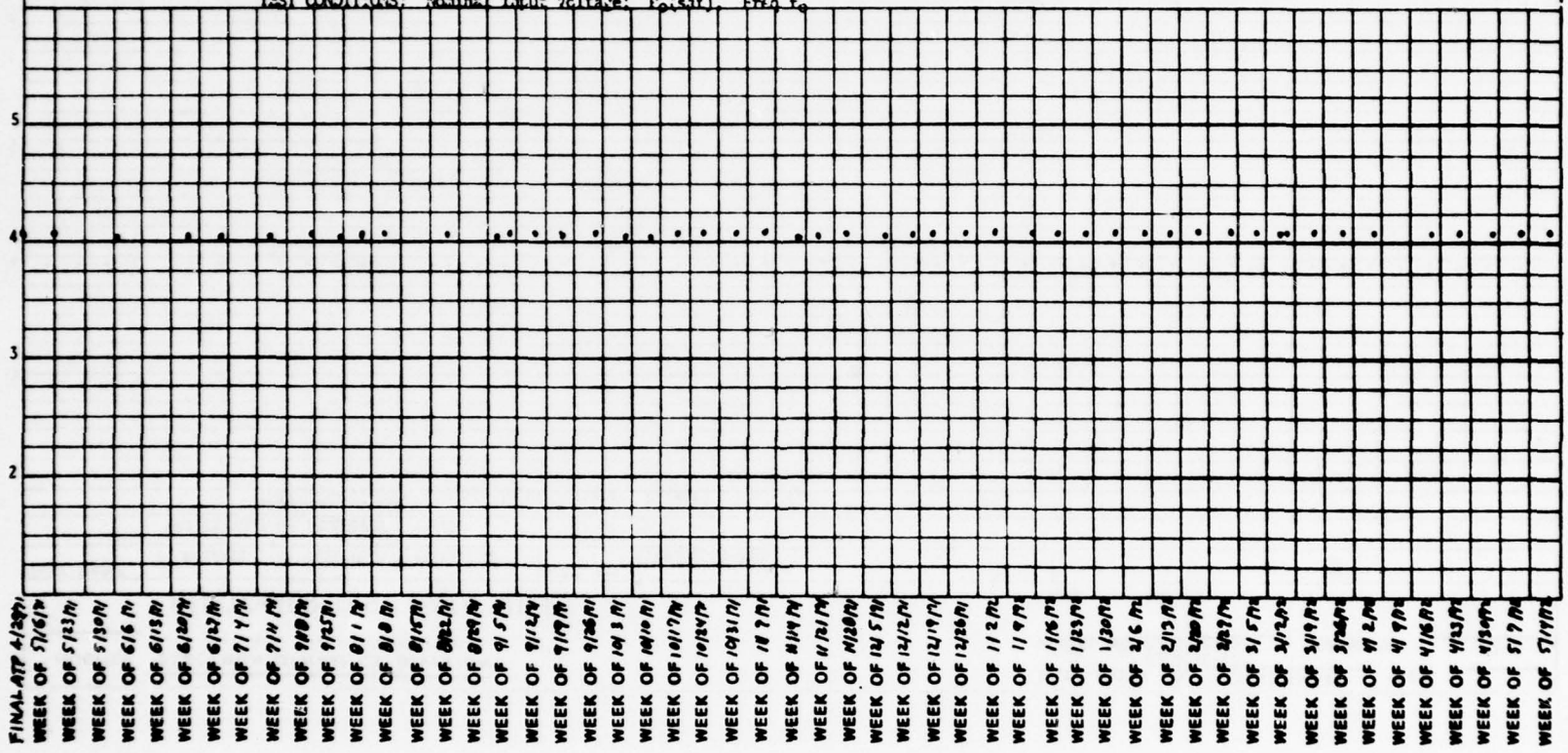
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO. LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat), Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat), Freq $f_o$

HEATH VOLTAGE TELEMETRY VOLTAGE (VOLTS)

5

4

3

2

WEEK OF 5/21/72
WEEK OF 5/28/72
WEEK OF 6/4/72
WEEK OF 6/11/72
WEEK OF 6/18/72
WEEK OF 6/25/72
WEEK OF 7/2/72
WEEK OF 7/9/72
WEEK OF 7/16/72
WEEK OF 7/23/72
WEEK OF 7/30/72
WEEK OF 8/6/72
WEEK OF 8/13/72
WEEK OF 8/20/72
WEEK OF 8/27/72
WEEK OF 9/3/72
WEEK OF 9/10/72
WEEK OF 9/17/72
WEEK OF 9/24/72
WEEK OF 10/1/72
WEEK OF 10/8/72
WEEK OF 10/15/72
WEEK OF 10/22/72
WEEK OF 10/29/72
WEEK OF 11/5/72
WEEK OF 11/12/72
WEEK OF 11/19/72
WEEK OF 11/26/72
WEEK OF 12/3/72
WEEK OF 12/10/72
WEEK OF 12/17/72
WEEK OF 12/24/72
WEEK OF 12/31/72
WEEK OF 1/7/73
WEEK OF 1/14/73
WEEK OF 1/21/73
WEEK OF 1/28/73
WEEK OF 2/4/73
WEEK OF 2/11/73
WEEK OF 2/18/73
WEEK OF 2/25/73
WEEK OF 3/4/73
WEEK OF 3/11/73
WEEK OF 3/18/73
WEEK OF 3/25/73
WEEK OF 4/1/73
WEEK OF 4/8/73
WEEK OF 4/15/73
WEEK OF 4/22/73
WEEK OF 4/29/73
WEEK OF 5/6/73
WEEK OF 5/13/73
WEEK OF 5/20/73

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

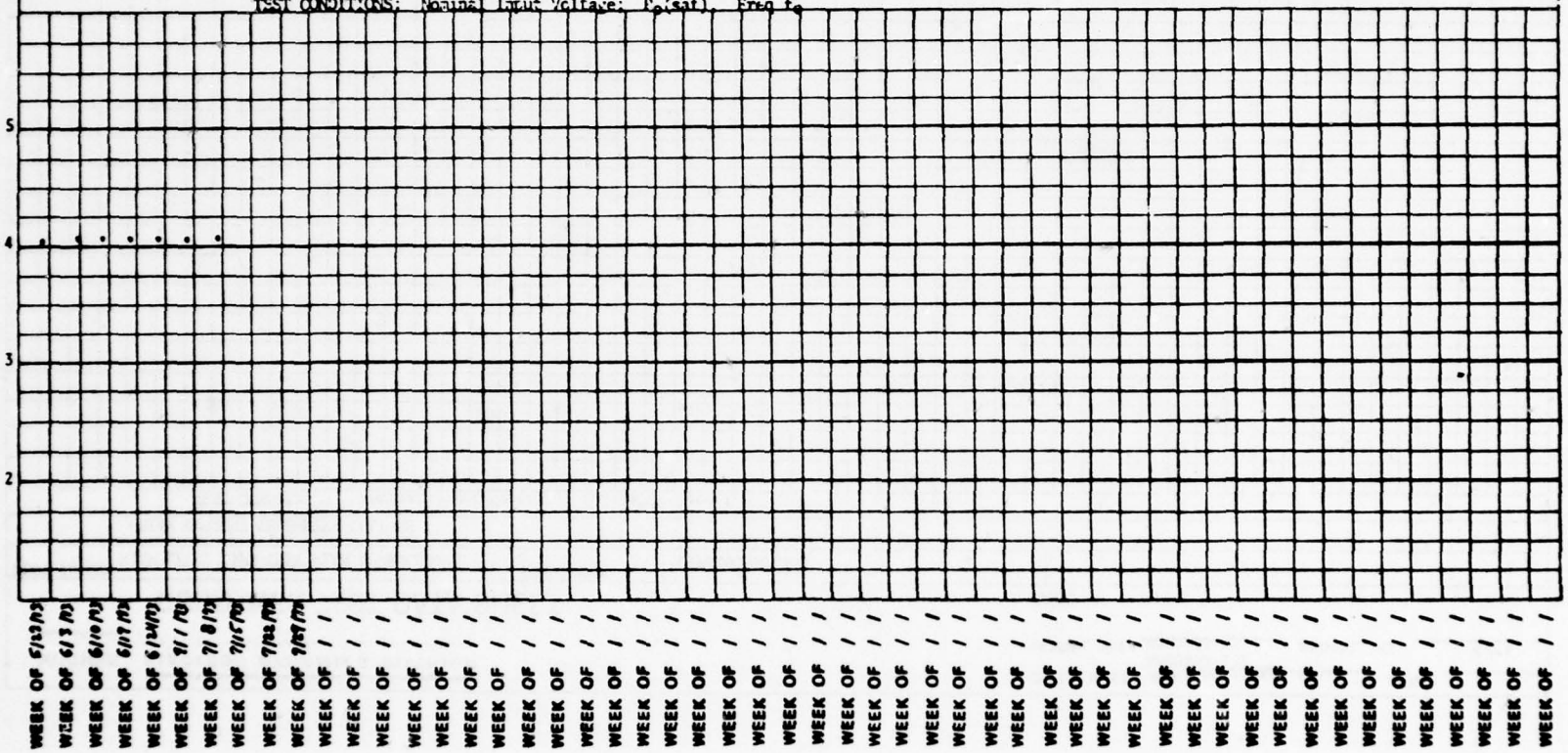
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO. LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat), Freq $f_o$


HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)
5
4
3
2
WEEK OF 5/22/72
WEEK OF 6/5/72
WEEK OF 6/12/72
WEEK OF 6/19/72
WEEK OF 6/26/72
WEEK OF 7/3/72
WEEK OF 7/10/72
WEEK OF 7/17/72
WEEK OF 7/24/72
WEEK OF 7/31/72
WEEK OF / /
WEEK OF / /
WEEK OF / /

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DATA SHEET NO. ~~DCB200350-400~~ REV. _____
MODEL NO. ~~B200350-121~~ B200350-122 SERIAL NO. 22-2

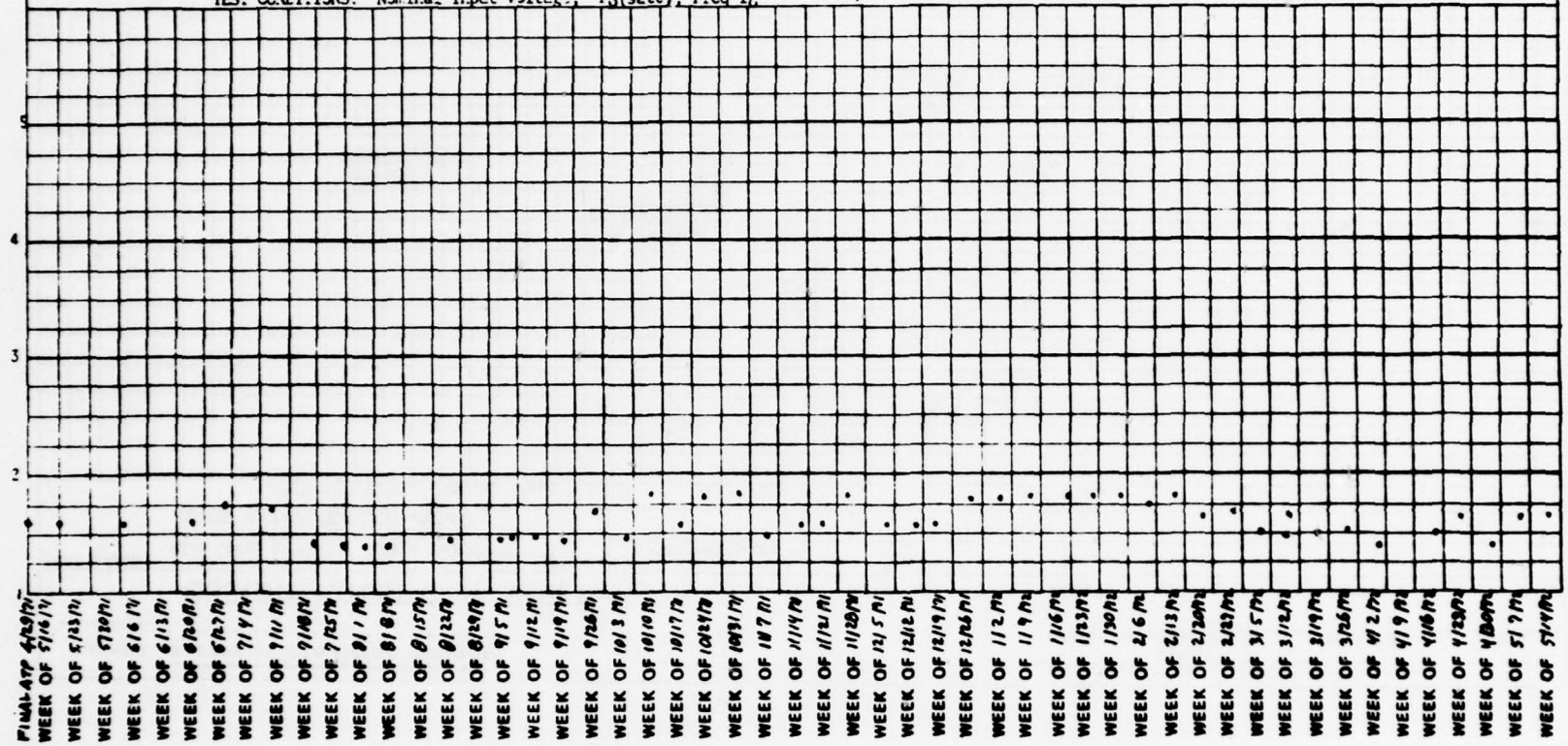
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(set0); Freq $f_o$



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DATA SHEET NO. ~~BCB200350-400~~ REV. _____
MODEL NO. ~~B200350-122~~ B200350-121 SERIAL NO. 22-2

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(set0); Freq $f_o$

HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

5
4
3
2

WEEK OF 5/21/84
WEEK OF 5/28/84
WEEK OF 6/4/84
WEEK OF 6/11/84
WEEK OF 6/18/84
WEEK OF 6/25/84
WEEK OF 7/2/84
WEEK OF 7/9/84
WEEK OF 7/16/84
WEEK OF 7/23/84
WEEK OF 7/30/84
WEEK OF 8/6/84
WEEK OF 8/13/84
WEEK OF 8/20/84
WEEK OF 8/27/84
WEEK OF 9/3/84
WEEK OF 9/10/84
WEEK OF 9/17/84
WEEK OF 9/24/84
WEEK OF 10/1/84
WEEK OF 10/8/84
WEEK OF 10/15/84
WEEK OF 10/22/84
WEEK OF 10/29/84
WEEK OF 11/5/84
WEEK OF 11/12/84
WEEK OF 11/19/84
WEEK OF 11/26/84
WEEK OF 12/3/84
WEEK OF 12/10/84
WEEK OF 12/17/84
WEEK OF 12/24/84
WEEK OF 12/31/84
WEEK OF 1/7/85
WEEK OF 1/14/85
WEEK OF 1/21/85
WEEK OF 1/28/85
WEEK OF 2/4/85
WEEK OF 2/11/85
WEEK OF 2/18/85
WEEK OF 2/25/85
WEEK OF 3/4/85
WEEK OF 3/11/85
WEEK OF 3/18/85
WEEK OF 3/25/85
WEEK OF 4/1/85
WEEK OF 4/8/85
WEEK OF 4/15/85
WEEK OF 4/22/85
WEEK OF 4/29/85
WEEK OF 5/6/85
WEEK OF 5/13/85
WEEK OF 5/20/85

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. ~~DSB200350-400~~ B200350-121 REV. _____

MODEL NO. ~~B200350-122~~ SERIAL NO. 22-2

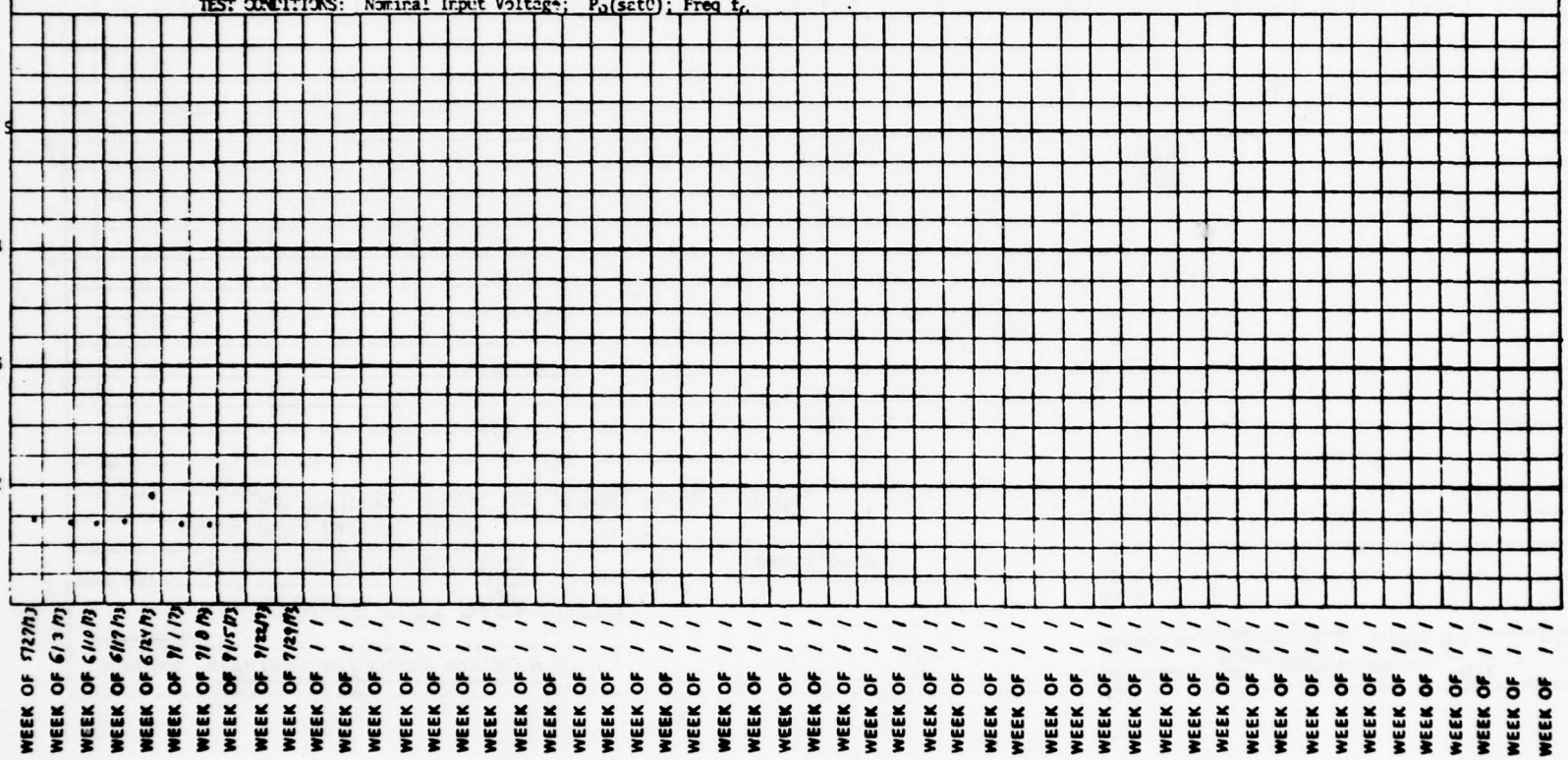
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(set0); Freq $f_o$




HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)

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DATA SHEET NO. DSB200350-4 00 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

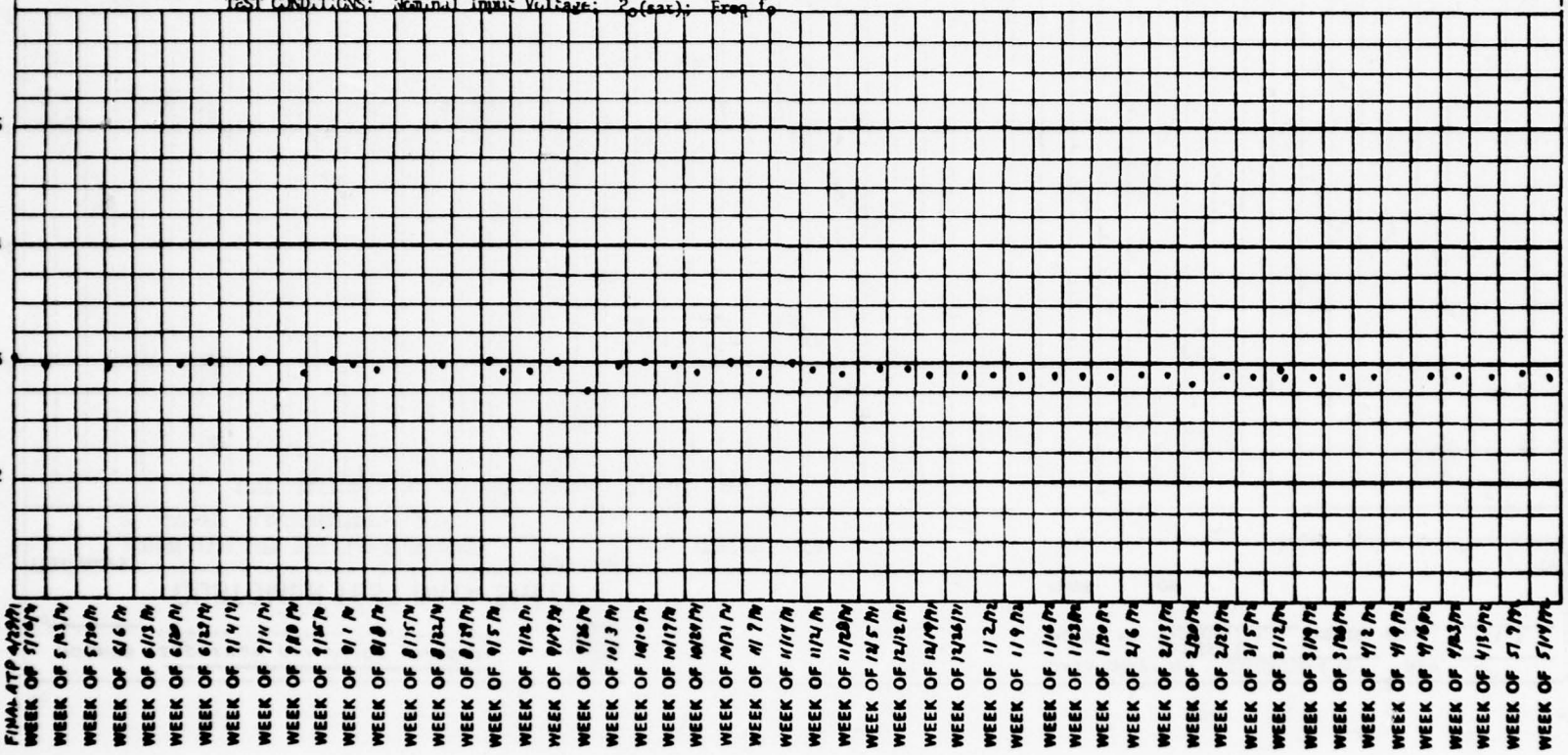
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



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DATA SHEET NO. DSB200350-4 00 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

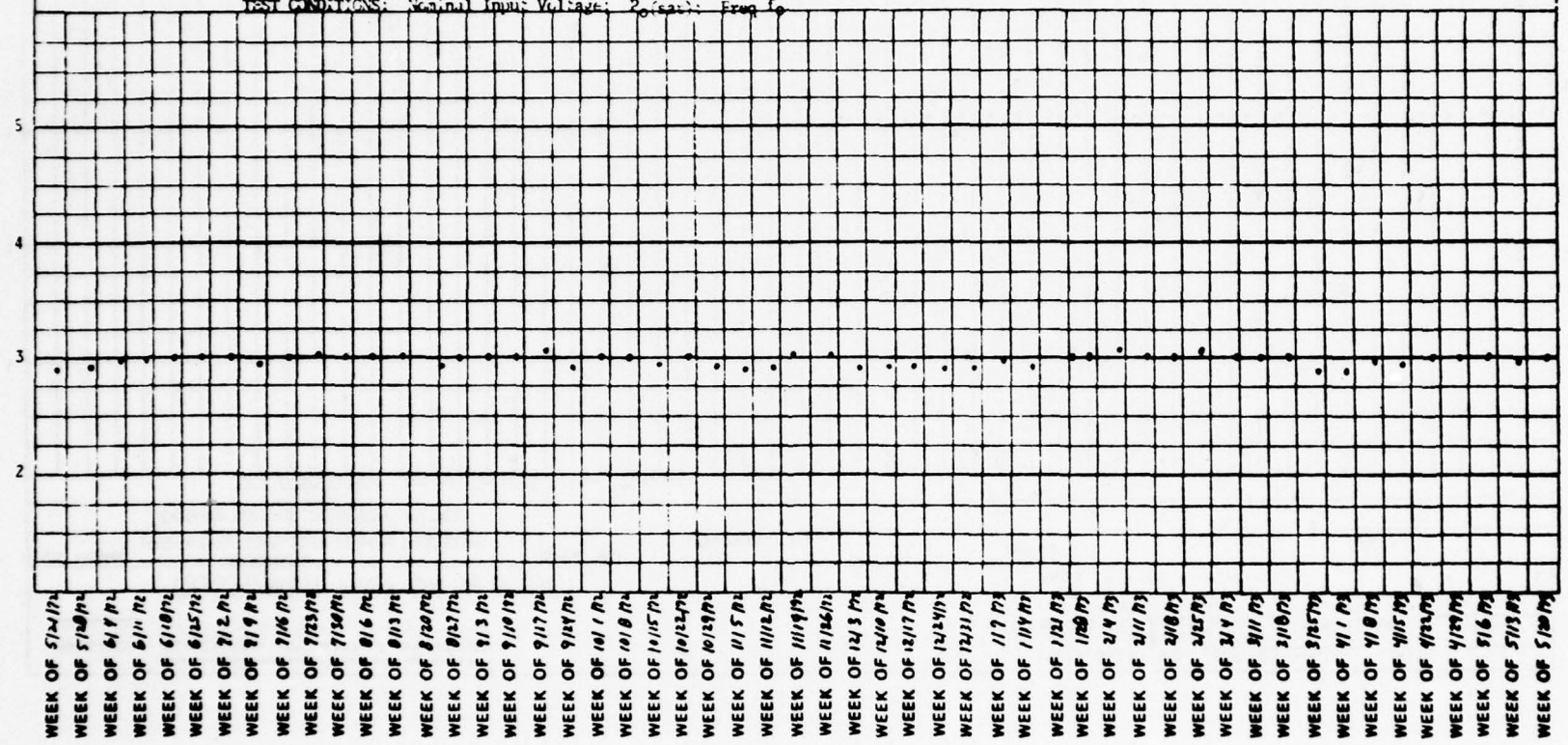
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO. LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 82-2

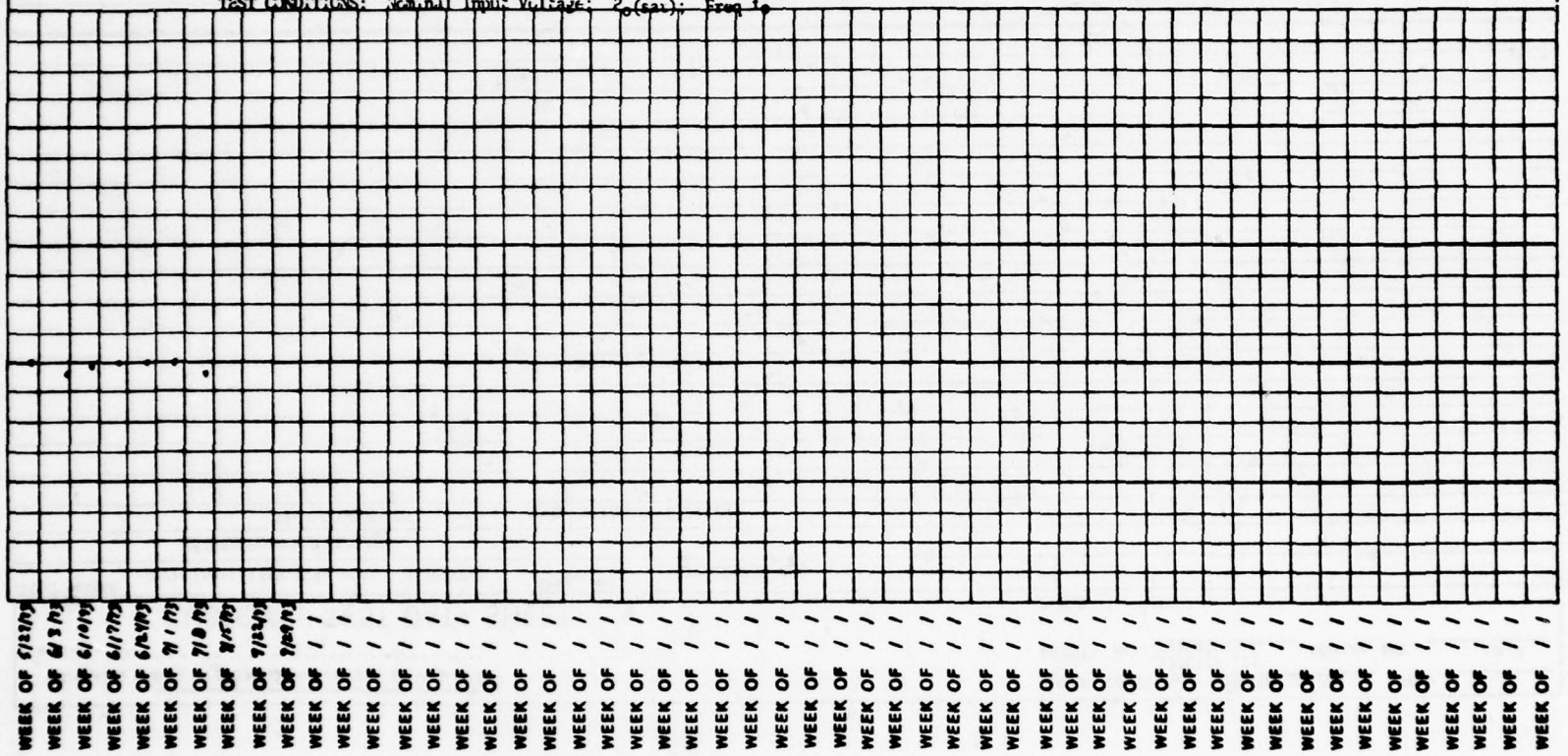
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $Z_o$(sat); Freq $f_o$



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DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 22-2

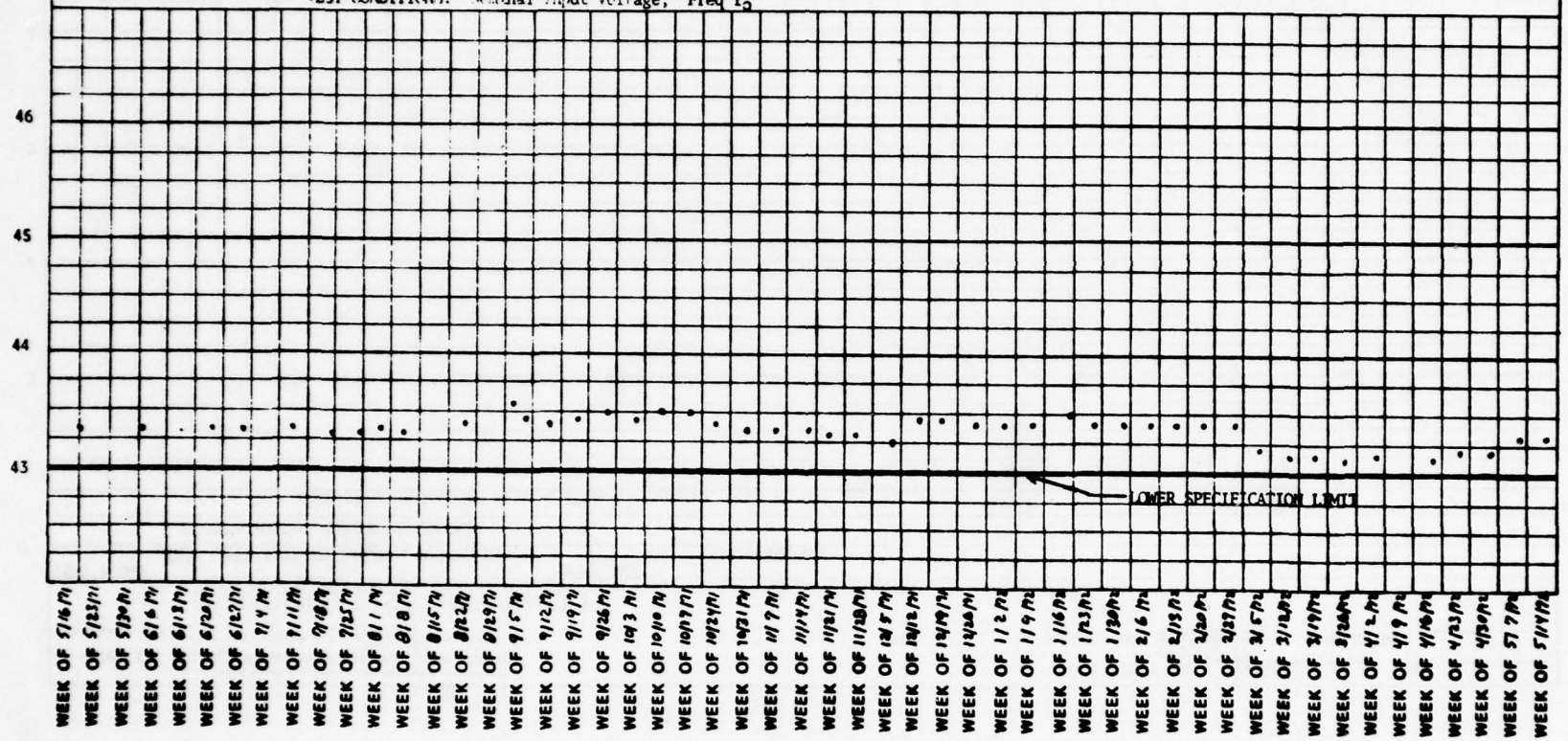
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



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DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. ~~B200350-122~~ B200350-121 SERIAL NO. 22-2

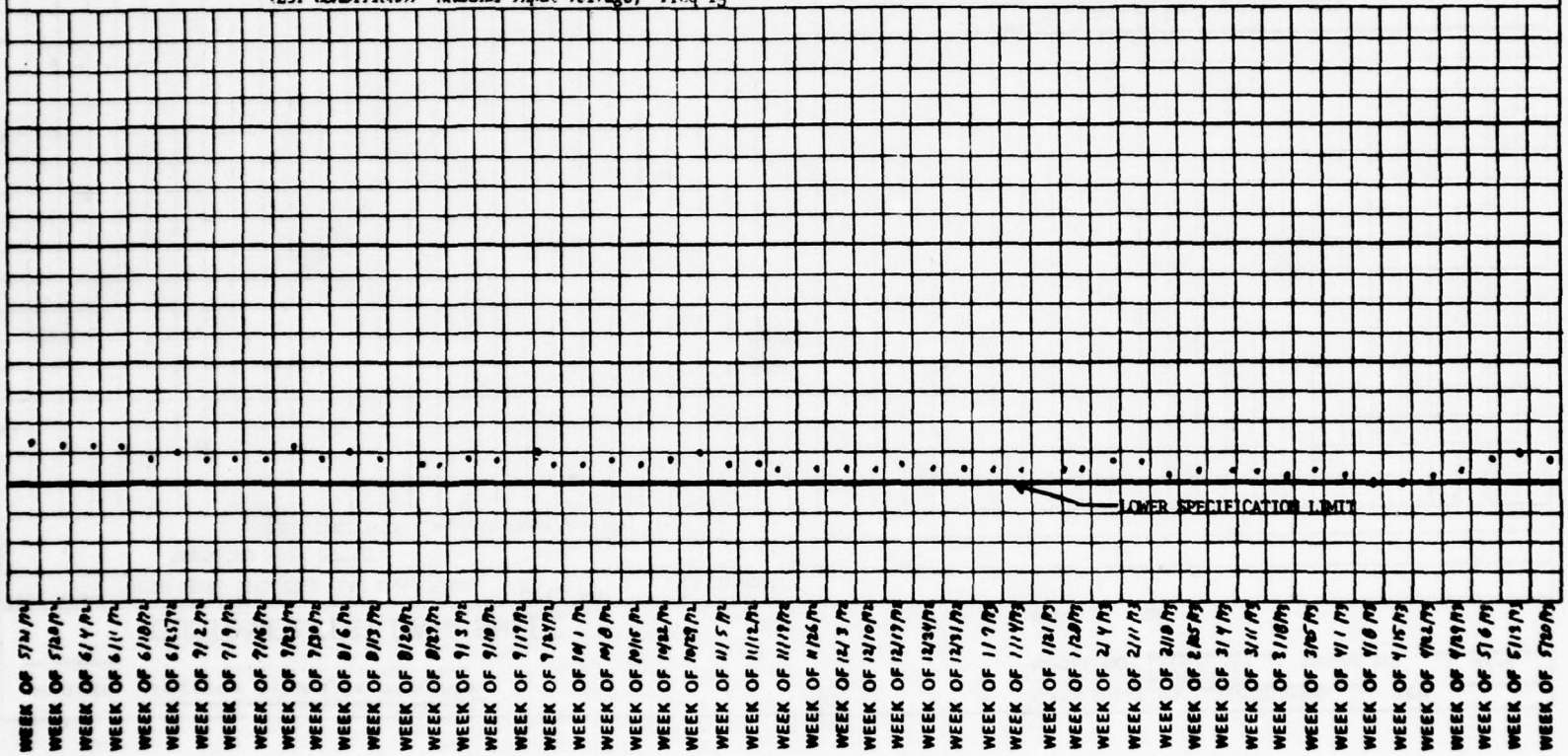
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 |
|---|---|---|---|

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_2$




SATURATED POWER OUTPUT (dBm)

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 SERIAL NO. 22-2

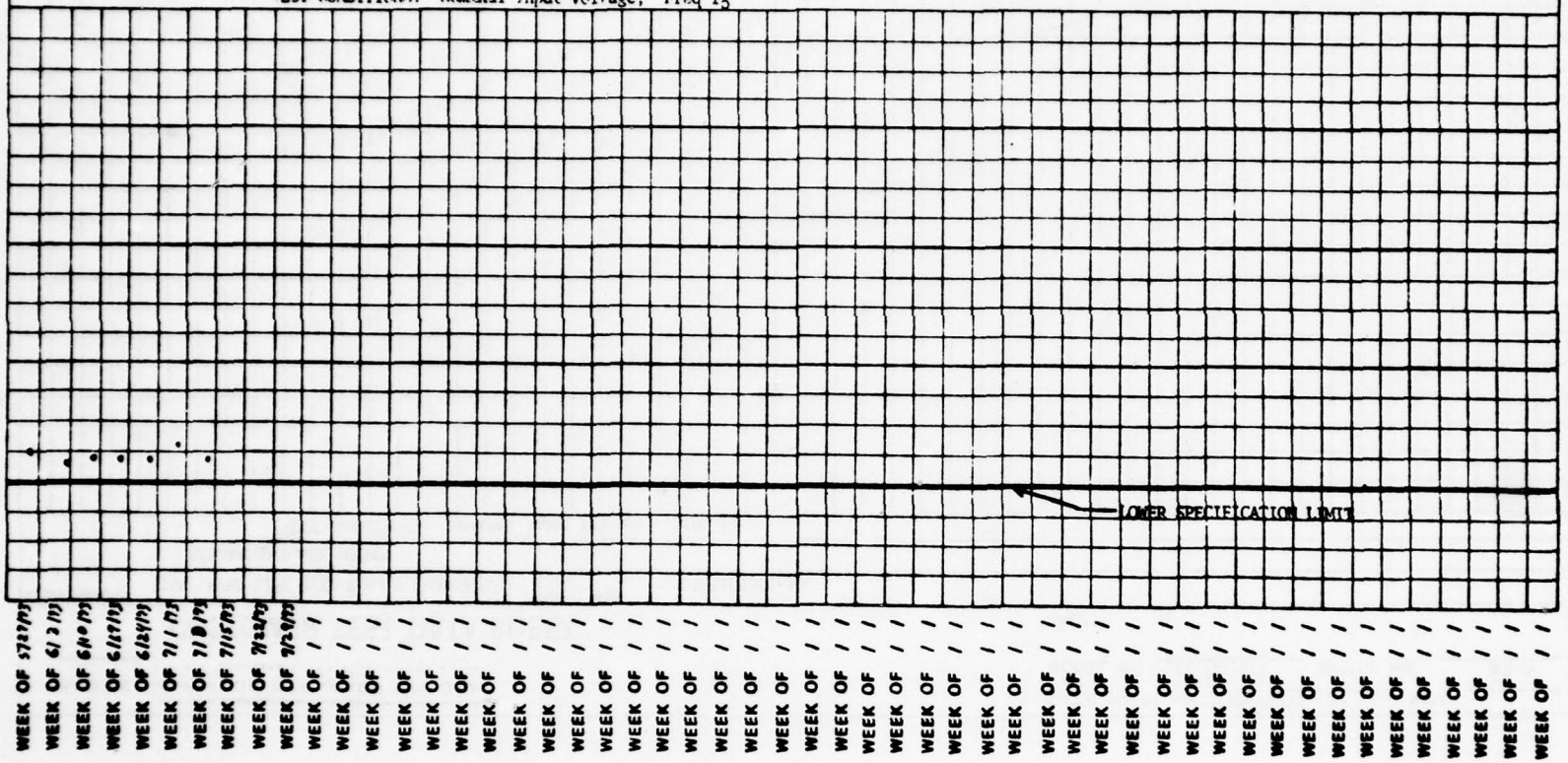
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO: LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB 200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

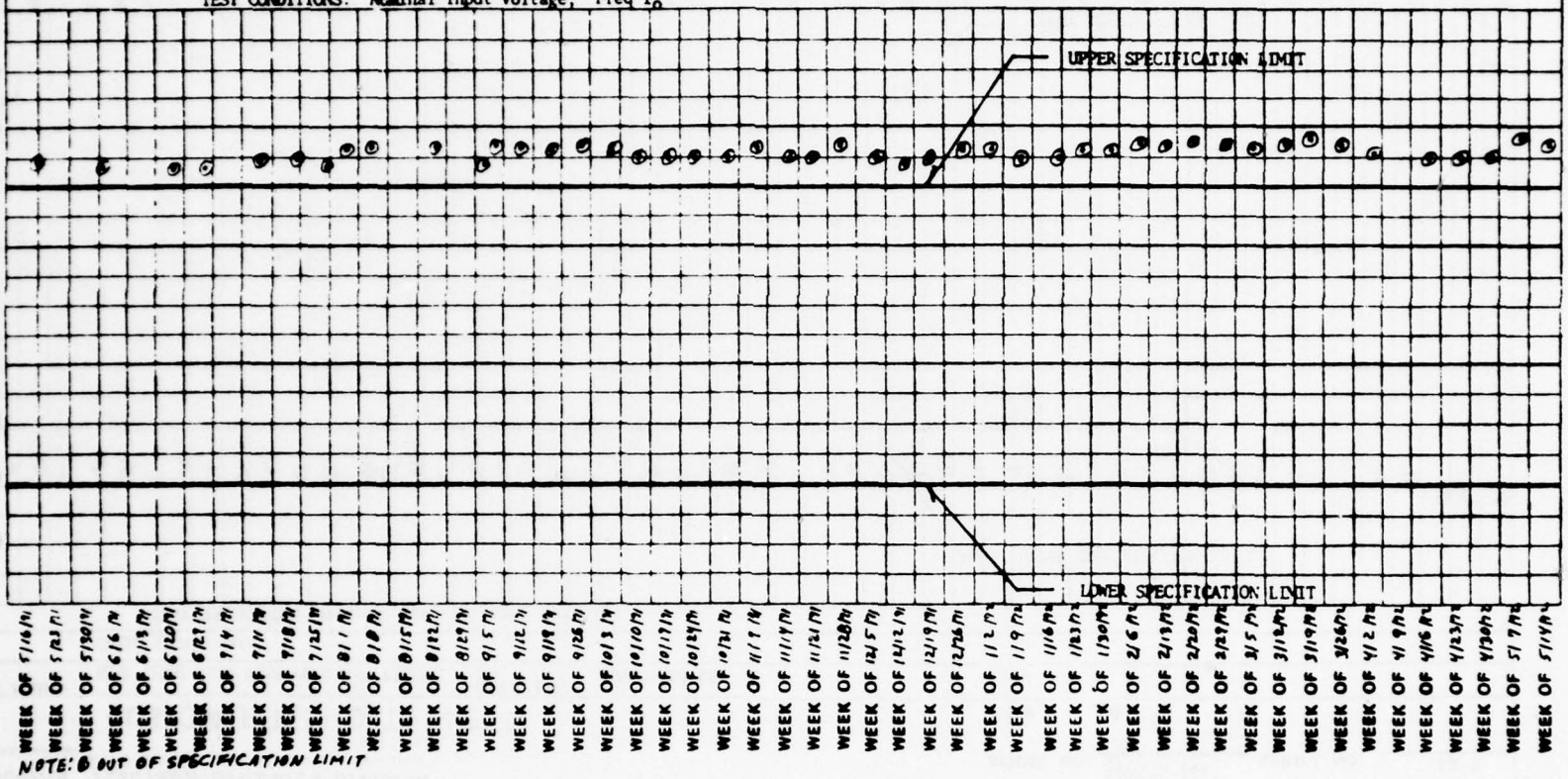
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC NO LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




NOTE: Ø OUT OF SPECIFICATION LIMIT

HUGHES **ELECTRON DYNAMICS DIVISION**
[illegible] W LOMITA BLVD TORRANCE CALIFORNIA 90509

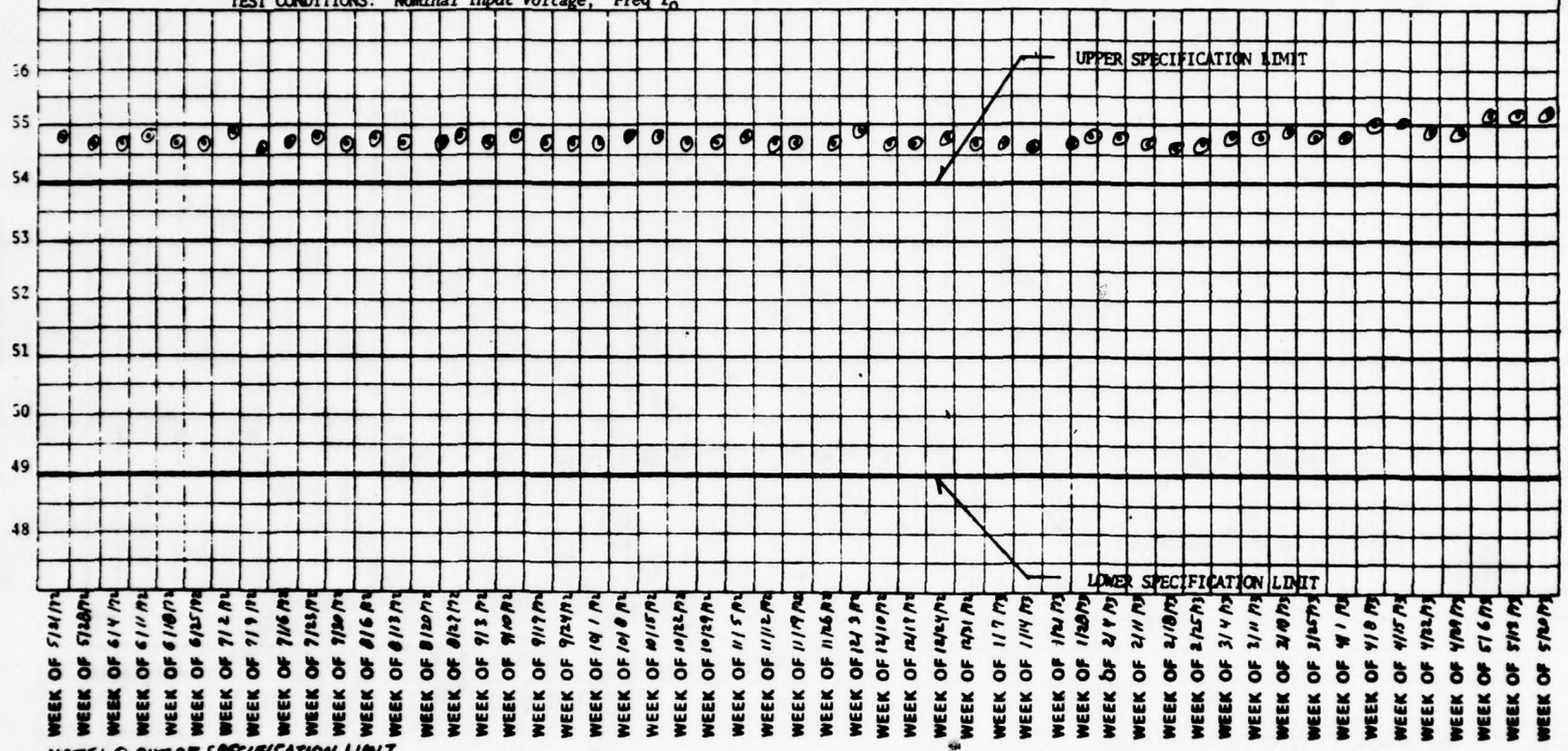
DATA SHEET NO. DSB 200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




NOTE: ⊙ OUT OF SPECIFICATION LIMIT

SMALL SIGNAL GAIN (dB)

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB 200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

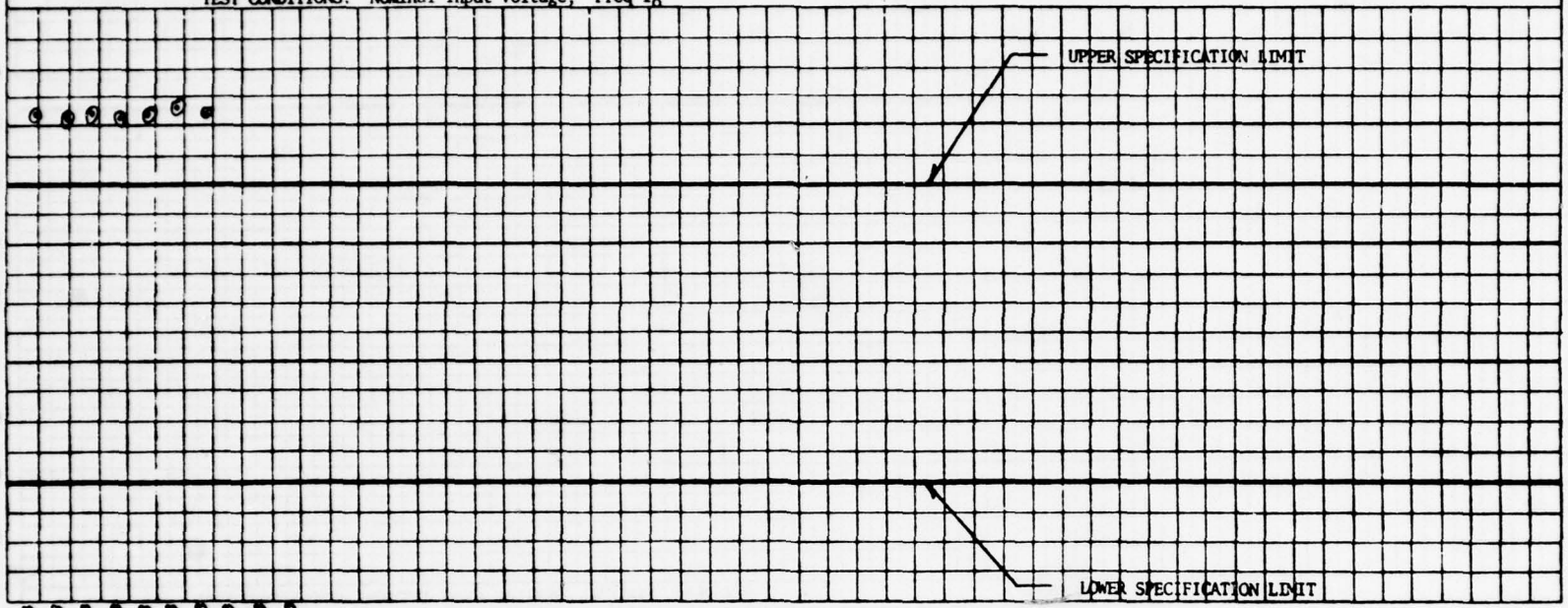
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




WEEK OF 5/11/73
WEEK OF 6/2/73
WEEK OF 6/10/73
WEEK OF 6/17/73
WEEK OF 6/24/73
WEEK OF 7/1/73
WEEK OF 7/8/73
WEEK OF 7/15/73
WEEK OF 7/22/73
WEEK OF 7/29/73
WEEK OF / / /

NOTE: ⊙ OUT OF SPECIFICATION LIMIT

SMALL SIGNAL GAIN (dB)

HUGHES ELECTRON DYNAMICS DIVISION
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DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

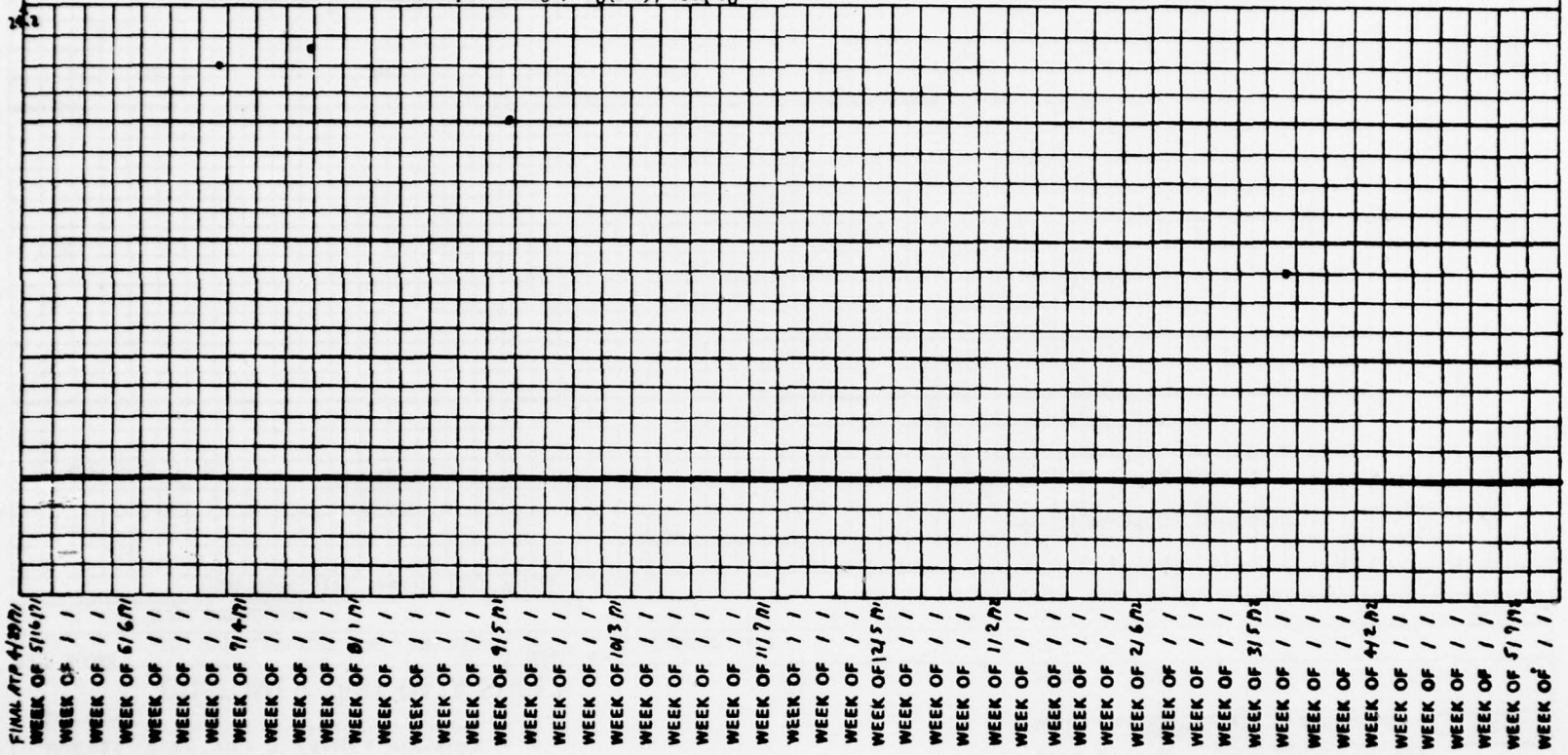
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



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DATA SHEET NO. DSB200350-400 REV. _____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-2

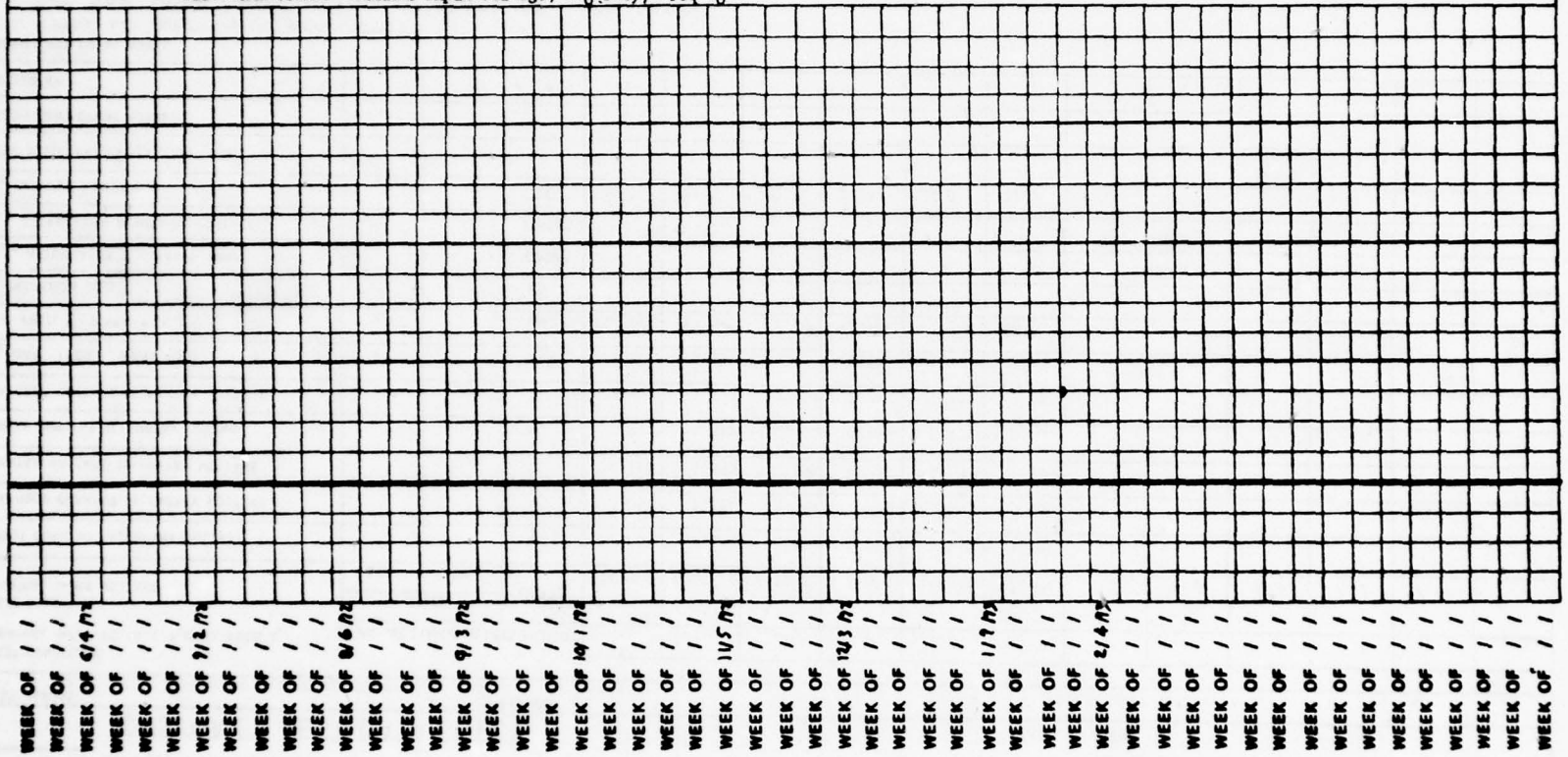
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$


V
CATHODE ACTIVITY KNEE (SECONDS)
22
21
20
19
18
17
16
15
WEEK OF / /
WEEK OF / /
WEEK OF 6/4 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/2 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 8/6 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 9/3 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/1 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 11/5 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 1/9 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4 ns
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

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DATA SHEET NO. HSR 600350-600 REV.
MODEL NO. B200350-122 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | |
|---|---|---|
| HIGH LEVEL LIFE TEST PLAN & PROCEDURE | HSPB200350-600 | ACCEPTANCE TEST DATA |

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | TOTAL ACCUMULATED HOURS | | | PRE FINAL | FINAL | 6,669 | 13,323 | 20,055 | 25,084 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LIMITS MIN | LIMITS MAX | UNITS | 7/29/71 | 8/3/71 | 5/19/72 | 3/10/73 | 1/2/74 | 8/6/74 | / / | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.068 | 2.014 | 2.044 | 2.047 | 2.010 | 1.999 | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.794 | 3.794 | 3.775 | 3.773 | 3.75 | 3.752 | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.164 | 4.155 | 4.159 | 4.135 | 4.15 | 4.145 | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | 0.377 | 0.372 | 0.509 | 0.483 | 0.435 | 0.431 | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.209 | 2.272 | 2.327 | 2.268 | 2.32 | 2.33 | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.26 | 43.25 | 43.45 | 43.25 | 43.10 | 43.10 | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.15* | 54.06* | 54.20* | 54.20* | 54.40* | 54.20 | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 24.9 | 24.4 | 22.9 | 22.9 | 21.7 | 21.3 | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | 1. | 1. | 1. | 1. | 1. | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. *DOES NOT MEET SPECIFICATION LIMIT
TWT has 1690 hours prior to start of life test.

BENCH FUNCTIONAL TEST DATA

HIGH LEVEL LIFE TEST PLAN AND PROCEDURE
SPEC: LTPB 200350-400
SERIAL NO. 22-3


| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 20055 | DATA 42098 | HOUR |
|---|---|---|---|---|---|---|---|
| 4.1 | CATHODE ACTIVITY, SECONDS | 15.0 | | 24.4 | 21.7 | 12.3 | |
| 4.2 | STABILITY | | | ✓ | ✓ | ✓ | |
| 4.3 | COMMAND SIGNAL | | | ✓ | ✓ | ✓ | |
| 4.4 | INRUSH CURRENT | | | | | | |
| a) | INTEGRAL >Iss, t=5msec, ma-sec | | 30 | 14.0 | 21.0 | 10.0 | |
| b) | INTEGRAL >Iss AT ON COMMAND, t=3msec | | 3.7 | 1.54 | 1.60 | 1.0 | |
| c) | I >Iss PRIOR TO H.V., AMPS | | 15 | 6.0 | 5.5 | 4.4 | |
| d) | I >Iss AT APPLICATION OF H.V. | | 25 | 14.5 | 13 | 15.0 | |
| e) | HIGH VOLTAGE TURN-ON TIME DELAY, sec | 60 | 120 | 88 | 95 | 97 | |
| f) | I>Iss, t=5msec AFTER H.V., AMPS | | .75 | 0.5 | 0.5 | 0.5 | |
| g) | I WITHIN ±3% Iss + >100msec | | | ✓ | ✓ | ✓ | |
| 4.5 | INPUT AND OUTPUT REFLECTION, VSWR | | | | | | |
| a) | OUTPUT (HOT) | | 2.0:1 | 1.78 | 1.86 | 2.40 | |
| b) | OUTPUT (COLD) | | 1.5:1 | 1.22 | 1.32 | 1.23 | |
| c) | INPUT (COLD) | | 1.25:1 | 1.17 | 1.17 | 1.19 | |
| d) | INPUT (HOT) | | 1.25:1 | 1.20 | 1.35 | 1.42 | |
| 4.6 | SATURATED POWER OUTPUT | | | | | | |
| a) | TELEMETRY VOLTAGES | | | | | | |
| | 1) INPUT CURRENT TLM V | | | 2.014 | 2.010 | 2.03 | |
| | 2) CATHODE CURRENT TLM V | | | 3.794 | 3.75 | 3.64 | |
| | 3) HEATER VOLTAGE TLM V | | | 4.155 | 4.15 | 4.16 | |
| | 4) HELIX CURRENT TLM V | | | 0.372 | .435 | .85 | |
| | 5) CATHODE VOLTAGE TLM V | | | 2.272 | 2.32 | 2.34 | |
| b) | $P_o$ (SAT.), dBm | 43 | | 43.25 | 43.10 | 43.1 | |
| c) | G (SAT.), dB | 45 | 48 | 46.89 | 47.15 | 47.5 | |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 20055 | DATA 42098 HOUR |
|---|---|---|---|---|---|---|
| 4.7 | SATURATED POWER OUTPUT AND INPUT POWER VS. INPUT VOLTAGE | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.25 | 43.10 | 43.1 |
| | 2) G (SAT.), dB | 45 | 48 | 46.89 | 47.15 | 47.5 |
| | 3) I in , AMPS | | | 3.849 | 3.820 | 3.79 |
| | 4) Pin (DC), WATTS | | 103 | 88.53 | 88.86 | 87.17 |
| b) | Vin = 33 ±.5V DC | | | | | |
| | 1) $P_o$ (SAT.), dBm | 43 | | 43.25 | 43.10 | 43.1 |
| | 2) G (SAT.), dB | 45 | 48 | 46.89 | 47.15 | 47.5 |
| | 3) I in , AMPS | | | 2.709 | 2.69 | 2.664 |
| | 4) Pin (DC), WATTS | | 103 | 89.397 | 88.77 | 87.90 |
| 4.8 | SATURATED POWER OUTPUT VARIATION | | | | | |
| a) | $P_o$ (SAT.) VARIATION , dB | | ±0.25 | ±0.13 | ±0.22 | ±0.05 |
| 4.9 | GAIN FLATNESS | | | | | |
| a) | NOMINAL INPUT VOLTAGE | | | ✓ | ✓ | ✓ |
| b) | Vin = 23 ±.5V DC | | | ✓ | ✓ | ✓ |
| c) | Vin = 33 ±.5V DC | | | ✓ | ✓ | ✓ |
| 4.10 | SMALL SIGNAL GAIN AND GAIN FLATNESS | | | | | |
| a) | Gss , dB | 49 | 54 | 54.06 | 54.4 | 54.5 |
| b) | G (Var), dB | | ±0.35 | ±0.20 | ±0.22 | ±0.3 |
| c) | Gss, Vin = 23 ±.5V DC , dB | 49 | 54 | 54.06 | 54.4 | 54.5 |
| d) | G (Var), Vin = 23 ±.5V DC, dB | | ±0.35 | ±0.20 | ±0.22 | ±0.3 |
| e) | Gss, Vin = 33 ±.5V DC, dB | 49 | 54 | 54.06 | 54.4 | 54.5 |
| f) | G (Var), Vin = 33 ±.5V DC, dB | | ±0.35 | ±0.20 | ±0.22 | ±0.3 |
| 4.11 | GAIN SLOPE , dB/Mhz | | | | | |
| a) | Vin = 23 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | 0.013 |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.005 | 0.008 | 0.006 |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.020 | 0.020 | 0.014 |
| b) | Vin = 28 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | 0.013 |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.005 | 0.008 | 0.006 |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.020 | 0.020 | 0.014 |
| c) | Vin = 33 ±.5V DC | | | | | |
| | 1) Gss $f_1$ to $f_2$ | | 0.020 | 0.008 | 0.008 | 0.013 |
| | 2) Gss $f_1$ to $f_3$ | | 0.035 | 0.005 | 0.008 | 0.006 |
| | 3) Gss $f_2$ to $f_4$ | | 0.035 | 0.020 | 0.020 | 0.014 |
| 4.12 | NOISE FIGURE | | | | | |
| a) | N.F., dB | | 33 | 29.0 | 28.0 | 27.0 |

S/N_____



| SPEC PARA # | TEST DESIGNATION | SPEC LIMITS MINIMUM | SPEC LIMITS MAXIMUM | DATA 0 | DATA 20055 | DATA 42078 | HOU |
|---|---|---|---|---|---|---|---|
| 4.13 | INTERMODULATION DISTORTION | | | | | | |
| a) | I.M. DISTORTION 2dB ABOVE $P_o$ (SAT.) | 9 | | 10.5 | 10.3 | 10.6 | |
| b) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 18 | | 21.0 | 21.0 | 21.8 | |
| c) | I.M. DISTORTION 3dB ABOVE $P_o$ (SAT.) | 27 | | 28.5 | 33.0 | 29.2 | |
| 4.14 | PHASE SHIFT, FREQ. $F_o$, $\Delta\phi/\Delta P_o$ , °/dB | | 45/30 | 28.2/30 | 29/30 | 28/30 | |
| 4.15 | AM/PM CONVERSION $\frac{\Delta \phi}{\Delta Pi(rl)}$ ,°/dB | | | | | | |
| a) | at +2dB | | 3.5 | 1.0 | 1.3 | 1.0 | |
| b) | at 0dB | | 3.5 | 1.2 | 1.3 | 1.5 | |
| c) | at -2dB | | 3.5 | 1.6 | 1.7 | 1.7 | |
| d) | at -3dB | | 3.5 | 1.6 | 1.7 | 1.7 | |
| e) | at -4dB | | 3.5 | 1.7 | 1.6 | 1.7 | |
| f) | at -5dB | | 3.5 | 1.8 | 1.6 | 2.0 | |
| g) | at -6dB | | 3.5 | 2.1 | 1.8 | 2.8 | |
| h) | at -7dB | | 3.5 | 2.2 | 2.0 | 3.3 | |
| i) | at -8dB | | 3.5 | 1.8 | 2.0 | 2.0 | |
| 4.16 | TIME DELAY DISTORTION | | | | | | |
| a) | T.D. ANY 10MHZ LINEAR INTERVAL , ns/Mhz | | 0.10 | 0.01 | .0.01 | 0.01 | |
| b) | T.D. PARABOLIC PORTION OF CURVE , $ns/Mhz^2$ | | .01 | 0.001 | 0.001 | 0.001 | |
| 4.17 | STABILITY (MISMATCH) | | | | | | |
| a) | NO $P_o$ OTHER THAN INHERENT NOISE | | | ✓ | ✓ | ✓ | |
| 4.18 | SPURIOUS OUTPUT COHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (HARMONIC) , dB | 10 | | 14.0 | 14.1 | 14.0 | |
| 4.18.1 | SPURIOUS OUTPUT INCOHERENT COMPONENTS | | | | | | |
| a) | $P_o$ (NON-HARMONIC) | 60dB BELOW FUNDAMENTAL | | ✓ | ✓ | ✓ | |
| 4.18.2 | SPURIOUS OUTPUT (AM) | | | ✓ | ✓ | ✓ | |
| 4.18.3 | SPURIOUS OUTPUT (PM) | | | ✓ | ✓ | ✓ | |

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS: NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$ / TEST CONDITIONS: NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 378 | 548 | 831 | 884 | 1026 | 1191 | 1388 | 1553 | 1697 | 1863 | 2002 | 2195 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 8/19/71 | week of 8/26/71 | week of 9/7/71 | week of 9/10/71 | week of 9/16/71 | week of 9/23/71 | week of 10/1/71 | week of 10/8/71 | week of 10/14/71 | week of 10/21/71 | week of 10/27/71 | week of 11/4/71 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.023 | 2.048 | 2.052 | 2.056 | 2.067 | 2.053 | 2.052 | 2.049 | 2.055 | 2.064 | 2.070 | 2.049 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.797 | 3.796 | 3.788 | 3.786 | 3.786 | 3.785 | 3.783 | 3.782 | 3.785 | 3.784 | 3.787 | 3.781 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.159 | 4.161 | 4.148 | 4.167 | 4.164 | 4.161 | 4.163 | 4.163 | 4.163 | 4.168 | 4.169 | 4.160 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .389 | .460 | .451 | .451 | .461 | .461 | .476 | .460 | .481 | .510 | .487 | .457 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.257 | 2.290 | 2.408 | 2.226 | 2.261 | 2.257 | 2.277 | 2.264 | 2.279 | 2.277 | 2.250 | 2.264 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.45 | 43.50 | 43.53 | 43.45 | 43.45 | 43.43 | 43.35 | 43.40 | 43.40 | 43.25 | 43.35 | 43.55 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 53.96 | 54.06* | 53.77 | 54.01 | 53.88 | 53.96 | 54.00 | 54.03 | 54.00 | 54.00 | 54.01 | 53.95 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | 23.5 | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | 11/2/71 |
| SIGNIFICANT EVENT NOTES | | | | | 1. | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES
1. DOES NOT MEET SPECIFICATION LIMIT. This reading is high throughout major portion of the test.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-133 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: [illegible] LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT), FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 2362 | 2557 | 2679 | 2840 | 3056 | 3230 | 3293 | 3481 | 3653 | 3822 | 4010 | 4179 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 11/11/71 | week of 11/19/71 | week of 11/24/71 | week of 12/1/71 | week of 12/10/71 | week of 12/17/71 | week of 12/27/71 | week of 12/30/71 | week of 1/6/72 | week of 1/13/72 | week of 1/22/72 | week of 1/28/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.035 | 2.046 | 2.038 | 2.041 | 2.038 | 2.060 | 2.040 | 2.055 | 2.050 | 2.05 | 2.04 | 2.06 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.779 | 3.780 | 3.782 | 3.780 | 3.777 | 3.770 | 3.771 | 3.779 | 3.777 | 3.77 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.158 | 4.151 | 4.157 | 4.161 | 4.159 | 4.167 | 4.158 | 4.163 | 4.159 | 4.165 | 4.16 | 4.17 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .505 | .491 | .520 | .500 | .490 | .512 | .500 | .515 | .500 | .520 | .500 | .520 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.347 | 2.271 | 2.363 | 2.320 | 2.300 | 2.277 | 2.270 | 2.311 | 2.307 | 2.29 | 2.29 | 2.29 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.25 | 43.30 | 43.30 | 43.30 | 43.30 | 43.40 | 43.40 | 43.40 | 43.40 | 43.20 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 53.80 | 54.00 | 53.85 | 54.15 | 54.00 | 54.05 | 54.00 | 54.00 | 54.00 | 53.90 | 54.00 | 54.05 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 24.2 | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | 1/28/72 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE $P_o$ (SAT) FREQ $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS | | UNITS | TOTAL ACCUMULATED HOURS | ~348 | 4515 | 4659 | 4825 | 4991 | 5136 | 5334 | 5476 | 5637 | 5760 | 6000 | 6150 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN | MAX | | | week of 2/4/72 | week of 2/11/72 | week of 2/17/72 | week of 2/24/72 | week of 3/3/72 | week of 3/9/72 | week of 3/17/72 | week of 3/23/72 | week of 3/30/72 | week of 4/7/72 | week-of 4/21/72 | week of 4/27/72 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | | 2.05 | 2.04 | 2.04 | 2.05 | 2.04 | 2.04 | 2.04 | 2.07 | 2.05 | 2.04 | 2.04 | 2.06 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | | 3.77 | 3.77 | 3.78 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | | 4.17 | 4.16 | 4.17 | 4.17 | 4.16 | 4.16 | 4.16 | 4.17 | 4.16 | 4.16 | 4.16 | 4.17 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | | .50 | .51 | .54 | .51 | .50 | .50 | .51 | .49 | .50 | .47 | .51 | .50 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | | 2.30 | 2.30 | 2.30 | 2.30 | 2.30 | 2.33 | 2.30 | 2.27 | 2.29 | 2.30 | 2.30 | 2.27 |
| $P_o$ (SAT) FREQ $f_o$ (PARA 4.3.3) | 43 | -- | dbm | | 43.25 | 43.36 | 43.37 | 43.25 | 43.20 | 43.15 | 43.20 | 43.20 | 43.20 | 43.15 | 43.20 | 43.25 |
| $G_m$ FREQ $f_o$ (PARA 4.3.1) | 43 | 54 | db | | 54.00 | 54.09 | 54.07 | 54.00 | 54.00 | 54.09 | 54.00 | 54.2 | 54.10 | 54.00 | 54.10 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | | |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | 4/19/72 | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-3
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# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | 6339 week of 5/5/72 | 6508 week of 4/12/72 | 6640 week of 5/18/72 | 6836 week of 5/26/72 | 6998 week of 6/2/72 | 7166 week of 6/9/72 | 7339 week of 6/16/72 | 7506 week of 6/23/72 | 7673 week of 6/30/72 | 7840 week of 7/7/72 | 8002 week of 7/14/72 | 8174 week of 7/21/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.05 | 2.04 | 2.05 | 2.03 | 2.05 | 2.03 | 2.04 | 2.04 | 2.06 | 2.04 | 2.04 | 2.04 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.77 | 3.78 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.17 | 4.16 | 4.16 | 4.15 | 4.16 | 4.15 | 4.16 | 4.15 | 4.16 | 4.16 | 4.16 | 4.16 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .51 | .51 | .52 | .51 | .511 | .510 | .50 | .51 | .51 | .47 | .50 | .50 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.25 | 2.35 | 2.32 | 2.38 | 2.33 | 2.38 | 2.33 | 2.33 | 2.30 | 2.32 | 2.35 | 2.33 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.25 | 43.40 | 43.45 | 43.35 | 43.25 | 43.30 | 43.35 | 43.35 | 43.40 | 43.30 | 43.35 | 43.40 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.00 | 54.00 | 54.00 | 54.00 | 54.20 | 54.20 | 54.30 | 54.20 | 54.20 | 54.20 | 54.00 | 54.20 |
| $L_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | 22.9 | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90505

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 8336 week of 7/28/72 | 8504 week of 8/4/72 | 8664 week of 8/11/72 | 8826 week of 8/18/72 | 8971 week of 8/28/72 | 9040 week of 8/31/72 | 9124 week of 9/8/72 | 9289 week of 9/15/72 | 9452 week of 9/22/72 | 9614 week of 9/29/72 | 9781 week of 10/6/72 | 9942 week of 10/13/72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.02 | 2.03 | 2.04 | 2.04 | 2.06 | 2.05 | 2.02 | 2.00 | 2.02 | 2.05 | 2.02 | 2.03 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.[illegible] | 3.78 | 3.77 | 3.78 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.15 | 4.16 | 4.15 | 4.16 | 4.16 | 4.16 | 4.16 | 4.15 | 4.15 | 4.16 | 4.16 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .50 | .51 | .51 | .50 | .49 | .50 | .50 | .49 | .48 | .49 | .50 | .51 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.36 | 2.35 | 2.36 | 2.31 | 2.31 | 2.32 | 2.36 | 2.43 | 2.40 | 2.32 | 2.36 | 2.37 |
| $P_o$ (SAT) FREQ $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.40 | 43.30 | 43.35 | 43.30 | 43.30 | 43.35 | 43.30 | 43.30 | 43.35 | 43.30 | 43.30 | 43.25 |
| Gm FREQ $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.30 | 54.40 | 54.20 | 54.30 | 54.30 | 54.40 | 54.40 | 54.10 | 54.30 | 54.10 | 54.30 | 54.30 |
| $I_L$ INSERTION LOSS | | | db | | | | | | 56.9 | | | 56.5 | | | 57.00 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | 22.18 | | | 22.20 | | | 22.22 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | 22.35 | | | 22.36 | | | 22.41 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | 9/7/72 | | | 9/29/72 | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] TORRANCE CALIFORNIA

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT) FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 10112 week of 10/20/72 | 10274 week of 10/27/72 | 10442 week of 11/3/72 | 10613 week of 11/10/72 | 10780 week of 11/17/72 | 10887 week of 11/22/72 | 11103 week of 12/1/72 | 11265 week of 12/8/72 | 11430 week of 12/15/72 | 11570 week of 12/21/72 | 11652 week of 12/29/72 | 11816 week of 1/5/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.03 | 2.05 | 2.03 | 2.05 | 2.05 | 2.01 | 2.01 | 2.04 | 2.03 | 2.03 | 2.02 | 2.02 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 | 3.78 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.16 | 4.16 | 4.16 | 4.16 | 4.16 | 4.15 | 4.15 | 4.16 | 4.15 | 4.16 | 4.16 | 4.16 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .49 | .49 | .50 | .48 | .49 | .48 | .49 | .49 | .49 | .48 | .46 | .46 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.33 | 2.30 | 2.33 | 2.28 | 2.30 | 2.33 | 2.41 | 2.31 | 2.30 | 2.33 | 2.36 | 2.33 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.25 | 43.30 | 43.30 | 43.20 | 43.30 | 43.25 | 43.20 | 43.20 | 43.30 | 43.25 | 43.20 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 54.10 | 54.10 | 54.20 | 54.00 | 54.10 | 54.10 | 54.10 | 54.20 | 54.10 | 54.10 | 54.10 | 54.10 |
| $I_L$ INSERTION LOSS | | | db | | | 59.00 | | | 56.00 | | | 58.00 | | | 58.00 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 22.24 | | | 22.28 | | | 22.28 | | | 22.32 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 22.42 | | | 22.46 | | | 22.46 | | | 22.50 |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | 22.8 | 22.80 | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 11977 | 12149 | 12382 | 12472 | 12644 | 12805 | 12972 | 13132 | 13322 | 13455 | 13624 | 13783 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 1/12/73 | week of 1/19/73 | week of 1/29/73 | week of 2/2/73 | week of 2/9/73 | week of 2/16/73 | week of 2/23/73 | week of 3/2/73 | week of 3/10/73 | week of 3/16/73 | week of 3/23/73 | week of 3/30/73 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.03 | 2.01 | 2.03 | 2.02 | 2.03 | 2.01 | 2.04 | 2.01 | 2.04 | 2.02 | 2.05 | 2.02 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.78 | 3.78 | 3.78 | 3.77 | 3.77 | 3.78 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.15 | 4.15 | 4.16 | 4.15 | 4.15 | 4.15 | 4.16 | 4.15 | 4.16 | 4.16 | 4.16 | 4.16 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .48 | .48 | .48 | .48 | .48 | .48 | .47 | .47 | .48 | .44 | .47 | .47 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.38 | 2.34 | 2.32 | 2.41 | 2.36 | 2.37 | 2.34 | 2.42 | 2.29 | 2.32 | 2.29 | 2.30 |
| $P_o$ (SAT) FREQ. $f_c$ (PARA 4.3.3) | 43 | -- | dbm | 43.10 | 43.10 | 43.10 | 43.25 | 43.30 | 43.25 | 43.10 | 43.20 | 43.20 | 43.25 | 43.15 | 43.15 |
| Gss FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10 | 54.10 | 54.20 | 54.10 | 54.50 | 54.30 | 54.30 | 54.10 | 54.10 | 54.30 | 54.10 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | 56.00 | | | 56.30 | | | | | | 56.30 |
| $R_{AIB}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 22.35 | | | 22.37 | | | | | | 22.35 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 22.52 | | | 22.53 | | | | | | 22.52 |
| $T_g$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | 22.90 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 1/12/73 | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. _____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC NO. LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

TOTAL ACCUMULATED HOURS

| | LIMITS MIN | LIMITS MAX | UNITS | 13956 week of 4/6/73 | 14124 week of 4/13/73 | 14291 week of 4/20/73 | 14437 week of 4/27/73 | 14604 week of 5/4/73 | 14771 week of 5/11/73 | 14932 week of 5/18/73 | 15105 week of 5/25/73 | 15267 week of 6/1/73 | 15442 week of 6/9/73 | 15581 week of 6/15/73 | 15748 week of 6/22/73 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.02 | 2.03 | 2.02 | 2.02 | 2.02 | 2.02 | 2.01 | 2.03 | 2.00 | 2.06 | 2.05 | 2.03 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.78 | 3.76 | 3.77 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.16 | 4.15 | 4.16 | 4.15 | 4.15 | 4.15 | 4.14 | 4.16 | 4.14 | 4.17 | 4.16 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .47 | .46 | .47 | .47 | .46 | .46 | .48 | .49 | .46 | .47 | .46 | .48 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.29 | 2.36 | 2.34 | 2.38 | 2.37 | 2.38 | 2.41 | 2.36 | 2.46 | 2.24 | 2.25 | 2.36 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.15 | 43.15 | 43.20 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 54.20 | 54.70 | 54.40 | 54.30 | 54.50 | 54.40 | 54.20 | 54.40 | 54.50 | 54.40 | 54.40 | 54.40 |
| $I_L$ INSERTION LOSS | | | db | | | | | | 56.8 | | | | | | 56.10 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | - | | | | | | 22.46 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | - | | | | | | 22.65 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 4/4/73 | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] W. LOMITA BLVD. TORRANCE, CALIFORNIA [illegible]

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 11977 | 12149 | 12382 | 12472 | 12644 | 12805 | 12972 | 13132 | 13322 | 13455 | 13624 | 13783 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 1/12/73 | week of 1/19/73 | week of 1/29/73 | week of 2/2/73 | week of 2/9/73 | week of 2/16/73 | week of 2/23/73 | week of 3/2/73 | week of 3/10/73 | week of 3/16/73 | week of 3/23/73 | week of 3/30/73 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.03 | 2.01 | 2.03 | 2.02 | 2.03 | 2.01 | 2.04 | 2.01 | 2.04 | 2.02 | 2.05 | 2.02 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.78 | 3.78 | 3.78 | 3.78 | 3.77 | 3.77 | 3.78 | 3.77 | 3.77 | 3.77 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.15 | 4.15 | 4.16 | 4.15 | 4.15 | 4.15 | 4.16 | 4.15 | 4.16 | 4.16 | 4.16 | 4.16 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .48 | .48 | .43 | .48 | .48 | .48 | .47 | .47 | .48 | .44 | .47 | .47 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.36 | 2.34 | 2.32 | 2.41 | 2.36 | 2.33 | 2.34 | 2.42 | 2.29 | 2.32 | 2.29 | 2.30 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.10 | 43.10 | 43.10 | 43.25 | 43.30 | 43.25 | 43.10 | 43.20 | 43.20 | 43.25 | 43.15 | 43.15 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.10 | 54.10 | 54.20 | 54.10 | 54.50 | 54.30 | 54.30 | 54.10 | 54.10 | 54.30 | 54.10 | 54.00 |
| $I_L$ INSERTION LOSS | | | db | | | 56.00 | | | 56.30 | | | | | | 56.30 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | 22.35 | | | 22.37 | | | | | | 22.35 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | 22.52 | | | 22.53 | | | | | | 22.52 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | 22.90 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 1/12/73 | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
[illegible] W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 13956 | 14124 | 14291 | 14437 | 14604 | 14771 | 14932 | 15105 | 15267 | 15442 | 15581 | 15748 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | week of 4/6/73 | week of 4/13/73 | week of 4/20/73 | week of 4/27/73 | week of 5/4/73 | week of 5/11/73 | week of 5/18/73 | week of 5/25/73 | week of 6/1/73 | week of 6/9/73 | week of 6/15/73 | week of 6/22/73 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.02 | 2.03 | 2.02 | 2.02 | 2.02 | 2.02 | 2.01 | 2.03 | 2.00 | 2.06 | 2.05 | 2.03 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.78 | 3.76 | 3.77 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.78 | 3.77 | 3.77 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.16 | 4.15 | 4.16 | 4.15 | 4.15 | 4.15 | 4.14 | 4.16 | 4.14 | 4.17 | 4.16 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .47 | .46 | .47 | .47 | .46 | .46 | .48 | .49 | .46 | .47 | .46 | .48 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.29 | 2.36 | 2.34 | 2.38 | 2.37 | 2.38 | 2.41 | 2.36 | 2.46 | 2.24 | 2.25 | 2.36 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.15 | 43.15 | 43.15 | 43.20 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 | 43.30 |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 49 | 54 | db | 54.20 | 54.70 | 54.40 | 54.30 | 54.30 | 54.40 | 54.30 | 54.40 | 54.50 | 54.40 | 54.40 | 54.40 |
| $I_L$ INSERTION LOSS | | | db | | | | | | 56.8 | | | | | | 56.10 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | - | | | | | | 22.46 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | - | | | | | | 22.65 |
| $T_E$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 4/4/73 | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT); FREQ. $f_o$

TOTAL ACCUMULATED HOURS

| TEST CONDITIONS NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | 15892 week of 6/29/73 | 16059 week of 7/6/73 | 16228 week of 7/13/73 | 16557 week of 7/27/73 | week of / / | week of / / | week of / / | week of / / | week of / / | week of / / | week of / / | week of / / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.02 | 1.99 | 2.04 | 2.03 | | | | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.78 | 3.77 | 3.79 | | | | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.15 | 4.15 | 4.16 | 4.16 | | | | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .47 | .47 | .48 | .47 | | | | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.37 | 2.38 | 2.36 | 2.35 | | | | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.35 | 43.30 | 43.30 | | | | | | | | |
| $G_m$ FREQ. $f_o$ (PARA 4.3.1) | 40 | 54 | db | 54.40 | 54.40 | 54.40 | 54.40 | | | | | | | | |
| $I_L$ INSERTION LOSS | | | db | | | | | | | | | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | | | | | | | | | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | | | | | | | | | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | | | | | | | | | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | | | | | | | | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

HUGHES **ELECTRON DYNAMICS DIVISION**
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90505

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$ (SAT), FREQ. $f_o$

TOTAL ACCUMULATED HOURS

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | 17,248 | 18,046 | 18,668 | 19,334 | 19,970 | 20,759 | 21,377 | 22,144 | 22,752 | 23,460 | 24,184 | 24,856 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/73 | 10/1/73 | 10/26/73 | 11/30/73 | 12/28/73 | 1/31/74 | 2/28/74 | 4/1/74 | 4/29/74 | 5/29/74 | 6/27/74 | 7/27/74 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.03 | 2.04 | 2.02 | 2.06 | 2.03 | 2.03 | 2.03 | 2.02 | 2.02 | 2.02 | 2.04 | 2.01 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.77 | 3.77 | 3.76 | 3.76 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.74 | 3.75 | 3.74 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.16 | 4.16 | 4.15 | 4.14 | 4.15 | 4.15 | 4.16 | 4.15 | 4.15 | 4.15 | 4.16 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .44 | .46 | .46 | .44 | .44 | .44 | .45 | .45 | .45 | .46 | .45 | .45 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.30 | 2.29 | 2.30 | 2.33 | 2.26 | 2.26 | 2.26 | 2.29 | 2.26 | 2.31 | 2.21 | 2.31 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.30 | 43.30 | 43.30 | 43.40 | 43.30 | 43.30 | 43.30 | 43.35 | 43.35 | 43.4 | 43.3 | 43.3 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.4# | 54.3# | 54.5# | 54.5# | 55.5# | 55.1# | 55.1# | 55.1# | 55.1# | 54.6# | 54.4# | 54.45# |
| $I_L$ INSERTION LOSS | | | db | 55.90 | 55.80 | 55.70 | 55.20 | 55.50 | 55.60 | 55.60 | 55.10 | 55.40 | 55.20 | 55.00 | 54.90 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 22.56 | 22.53 | 22.60 | 22.66 | 22.67 | 22.70 | 22.70 | 22.76 | 22.74 | 22.79 | 22.80 | 22.83 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 22.73 | 22.80 | 22.80 | 22.85 | 22.88 | 22.88 | 22.89 | 22.95 | 22.95 | 22.98 | 22.97 | 23.02 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 22.7 | 22.7 | * | | 21.7 | 22.20 | 22.1 | 22.2 | 22.2* | 22.0 | 22.9 | 21.9 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8/10/73 | 8/10/73 | 8/10/73 | 8/10/73 | 11/28/73 | 11/28/73 | 11/28/73 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 | 3/27/74 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | | | | | | | | | | | | |

SIGNIFICANT EVENT NOTES

*RECORDER OUT FOR REPAIRS.
#DOES NOT MEET SPECIFICATION LIMITS.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-3
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

TEST CONDITIONS
NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$

TEST CONDITIONS
NOMINAL INPUT VOLTAGE

| | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS 25,586 | 26,327 | 27,117 | 27,828 | 28,428 | 29,216 | 29,824 | 30,508 | 31,295 | 31,988 | 32,656 | 33,370 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 8/28/74 | 9/30/74 | 11/12/74 | 12/13/74 | 12/28/74 | 1/30/75 | 2/27/75 | 3/28/75 | 4/30/75 | 5/31/75 | 7/2/75 | 8/12/75 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.004 | 2.010 | 2.00 | 2.02 | 2.01 | 2.01 | 1.99 | 1.99 | 1.99 | 1.97 | 2.00 | 2.00 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.748 | 3.733 | 3.74 | 3.74 | 3.74 | 3.74 | 3.72 | 3.73 | 3.72 | 3.74 | 3.73 | 3.73 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.146 | 4.153 | 4.15 | 4.15 | 4.15 | 4.15 | 4.14 | 4.14 | 4.15 | 4.14 | 4.15 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .422 | .435 | .42 | .45 | .44 | .44 | .44 | .43 | .44 | .40 | .43 | .43 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.334 | 2.28 | 2.30 | 2.28 | 2.28 | 2.25 | 2.29 | 2.32 | 2.26 | 2.34 | 2.26 | 2.31 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.2 | 43.25 | 43.5 | 43.3 | 43.3 | 43.4 | 43.15 | 43.4 | 43.3 | 43.3 | 43.4 | 43.4 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.3* | 54.5* | 54.3* | 54.3* | 54.5* | 54.5* | 55.0* | 54.6* | 54.5* | 54.6* | 54.8* | 54.6* |
| $L_L$ INSERTION LOSS | | | db | 54.6 | 54.5 | 54.7 | 53.8 | 54.1 | 55.0 | 54.3 | 54.3 | 54.3 | 54.0 | 53.7 | 55.3 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 22.89 | 22.94 | 22.99 | 23.02 | 23.11 | 23.10 | 23.16 | 23.19 | 23.4 | 23.49 | 23.49 | 23.35 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 23.27 | 23.13 | 23.17 | 23.23 | 23.29 | 23.27 | 23.36 | 23.38 | 23.2 | 23.23 | 23.27 | 23.55 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 22.0 | 21.5 bf | 21.2 | 22.0 | 21.9 | 21.4 | 21.0 | 21.3 | 21.0 | 21.0 | 21.0 | 19.8 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-24-4 | 7-24-4 | 7-24-4 | 11-21-4 | 11-21-4 | 11-21-4 | 1-31-5 | 1-31-5 | 1-31-5 | 4-1-5 | 4-1-5 | 7-30-5 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | N PN | W.P.N | WPN |

SIGNIFICANT EVENT NOTES
* INTERMITTENT
# OUT OF SPECIFICATION LIMIT

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV.
MODEL NO. B200350-121 B200350-123 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 34,141 | 34,881 | 35,549 | 36,322 | 37,273 | 37,759 | 38,425 | 38,233 | 39,276 | 40592 | 41,264 | 42968 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 9/3/5 | 10/4/5 ~~10/4/5~~ | 11/1/5 | 12/3/5 | 1/14/6 | 2/3/6 | 3/2/6 | 4/5/6 | 4/28/6 | 6/1/6 | 6/29/6 | 9/8/6 |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.02 | 2.02 | 2.01 | 2.02 | 2.02 | 2.02 | 2.00 | 1.99 | 1.99 | 1.99 | 1.98 | 2.00 |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.73 | 3.72 | 3.71 | 3.71 | 3.70 | 3.69 | 3.70 | 3.68 | 3.66 | 3.65 | 3.66 | 3.65 |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.16 | 4.16 | 4.15 | 4.15 | 4.16 | 4.16 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .45 | .46 | .50 | .50 | .60 | .60 | .64 | .63 | .75 | .71 | .72 | 1.0 |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.24 | 2.24 | 2.28 | 2.25 | 2.32 | 2.28 | 2.39 | 2.40 | 2.37 | 2.36 | 2.40 | 2.44 |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.3 | 43.25 | 43.3 | 43.20 | 43.15 |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.7* | 54.7* | 54.7* | 54.7* | 54.7* | 54.7 | 54.6* | 54.53* | 54.60* | 54.6* | 54.70* | 54.80 |
| $I_L$ INSERTION LOSS | | | db | 53.6 | 53.8 | 53.2 | 54.0 | 53.6 | 53.4 | 53.2 | 53.0 | 52.5 | 51.5 | 54.5 | 51.8 |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 23.37 | 23.41 | 23.5 | 23.51 | 23.55 | 23.58 | 23.63 | 23.76 | 2383 | 23.92 | 2390 | 24.2 |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 23.6 | 23.62 | 23.6 | 23.71 | 23.80 | 23.98 | 23.95 | 24.24 | 24.17 | 24.16 | 24.14 | 24.54 |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 20.2 | 20.8 | 20.4 | 20.0 | 20.0 | 20.2 | 20.0 | 20.0 | 20.0 | 19.0 | 17.3 | 10.3 |
| TEST EQUIPMENT CALIBRATION DATE | | | | 7-30-5 | 7-30-5 | 10-29-5 | 10-29-5 | 10-29-5 | 2-3-6 | 2-3-6 | 2-3-6 | 2-3-6 | 5-7-6 | 5-12-6 | 7-23-6 |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | WPN | W.P.N | W.P.N | W.P.N | W.P.N | W.P.N | M.S.K. | M.S.K. | M.S.K. | W.P.N | M.S.K. | W.P.N |

SIGNIFICANT EVENT NOTES

* out of specification limit

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. A
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC NO.: LTPB200350-400

| TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE, $P_o$(SAT); FREQ. $f_o$<br>TEST CONDITIONS<br>NOMINAL INPUT VOLTAGE | LIMITS MIN | LIMITS MAX | UNITS | TOTAL ACCUMULATED HOURS: 43,818 | 44,044 | 44,798 | 45,504 | 46,242 | 47099 | 47,531 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 10/1/76 | 10/27/76 | 11/27/76 | 12/29/76 | 2/2/77 | 3/1/77 | 3/29/77 | / / | / / | / / | / / | / / |
| INPUT CURRENT TELEMETRY VOLTAGE | | | V | 2.012 | 2.192 | 2.209 | 2.202 | 1.999 ~~2.174~~* | 1.937 | 1.997 | | | | | |
| CATHODE CURRENT TELEMETRY VOLTAGE | | | V | 3.688 | 3.685 | 3.702 | 3.703 | 3.687 | 3.683 | 3.671 | | | | | |
| HEATER VOLTAGE TELEMETRY VOLTAGE | | | V | 4.159 | 4.150 | 4.158 | 4.158 | 4.141 | 4.156 | 4.150 | | | | | |
| HELIX CURRENT TELEMETRY VOLTAGE | | | V | .876 | .823 | .722 | .695 | .707 | .803 | 1.055 | | | | | |
| CATHODE VOLTAGE TELEMETRY VOLTAGE | | | V | 2.427 | 2.496 | 2.415 | 2.410 | 2.460 | 2.444 | 2.520 | | | | | |
| $P_o$ (SAT) FREQ. $f_o$ (PARA 4.3.3) | 43 | -- | dbm | 43.35 | 43.35 | 43.35 | 43.35 | 43.35 | 43.40 | 43.20 | | | | | |
| $G_m$ FREQ. $f_o$ (PARA. 4.3.1) | 49 | 54 | db | 54.95* | 55.10* | 55.15* | 55.25* | 55.20* | 55.35* | 55.20* | | | | | |
| $I_L$ INSERTION LOSS | | | db | 53.5 | 50.0 | 51.7 | 53.0 | 51 | 50 | 50. | 52 | | | | |
| $R_{AIN}$ ATTENUATOR RESISTANCE, INPUT | | | OHMS | 24.40 | 24.45 | 24.53 | 24.58 | 24.70 | 24.84 | 24.83 | 24.96 | | | | |
| $R_{AO}$ ATTENUATOR RESISTANCE, OUTPUT | | | OHMS | 24.65 | 24.69 | 24.81 | 25.34 | 24.69 | 25.05 | 25.32 | 25.22 | | | | |
| $T_K$ CATHODE ACTIVITY | 15.0 | -- | SEC | 8.3* | 8.0* | 7.8* | 8.5* | 5.7* | 4.8* | 5.2* | 4.1* | | | | |
| TEST EQUIPMENT CALIBRATION DATE | | | | 8-31-6 | 8-31-6 | 10-19-6 | 8-31-6 | 1-19-7 | 1-19-7 | 1-19-7 | | | | | |
| SIGNIFICANT EVENT NOTES | | | | | | | | | | | | | | | |
| TESTED BY | | | | MSK | MSK | MSK | MSK | MSK | DRJ | MSK | DRJ | | | | |

SIGNIFICANT EVENT NOTES
* OUT OF SPEC.

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE CALIFORNIA 90505

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

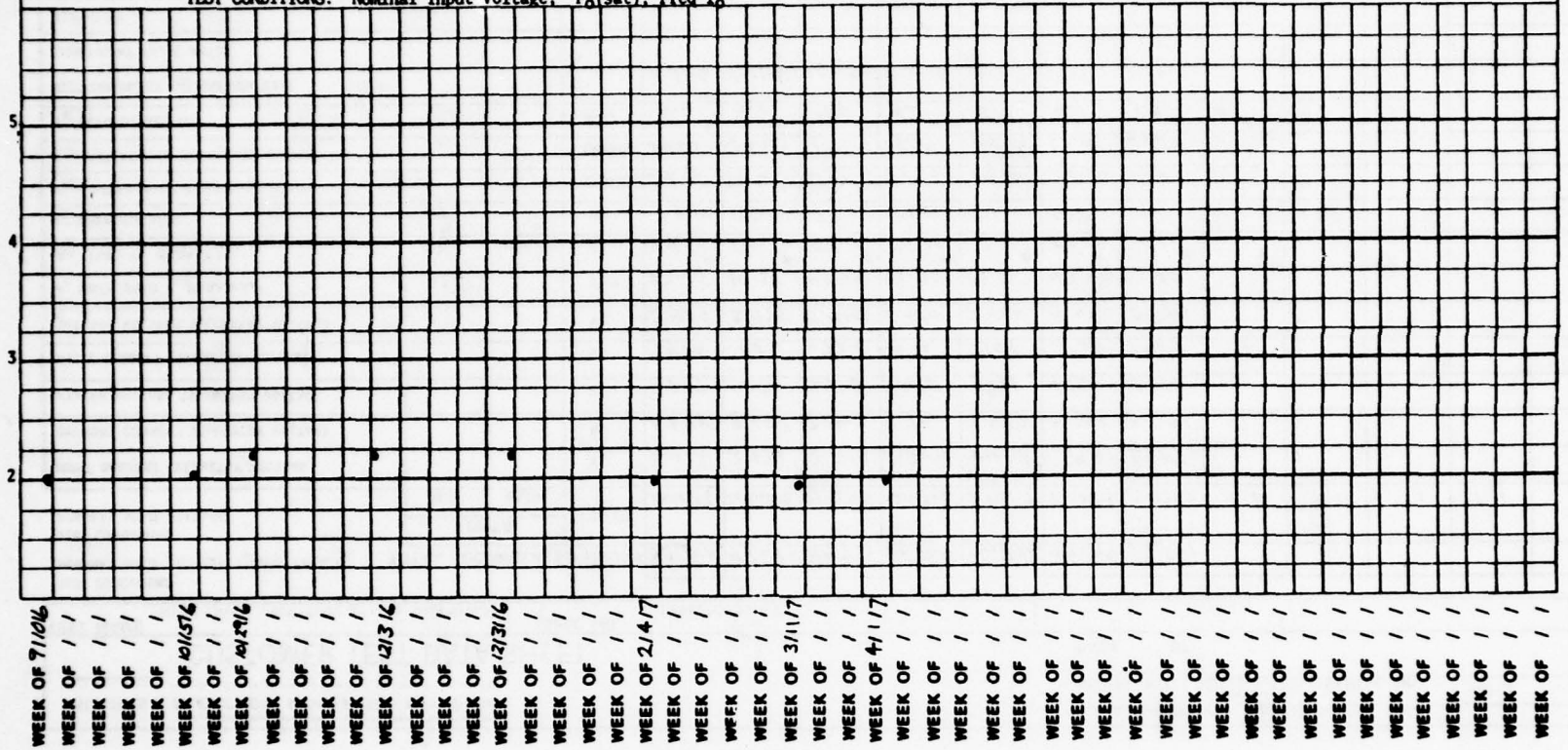
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

INPUT CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

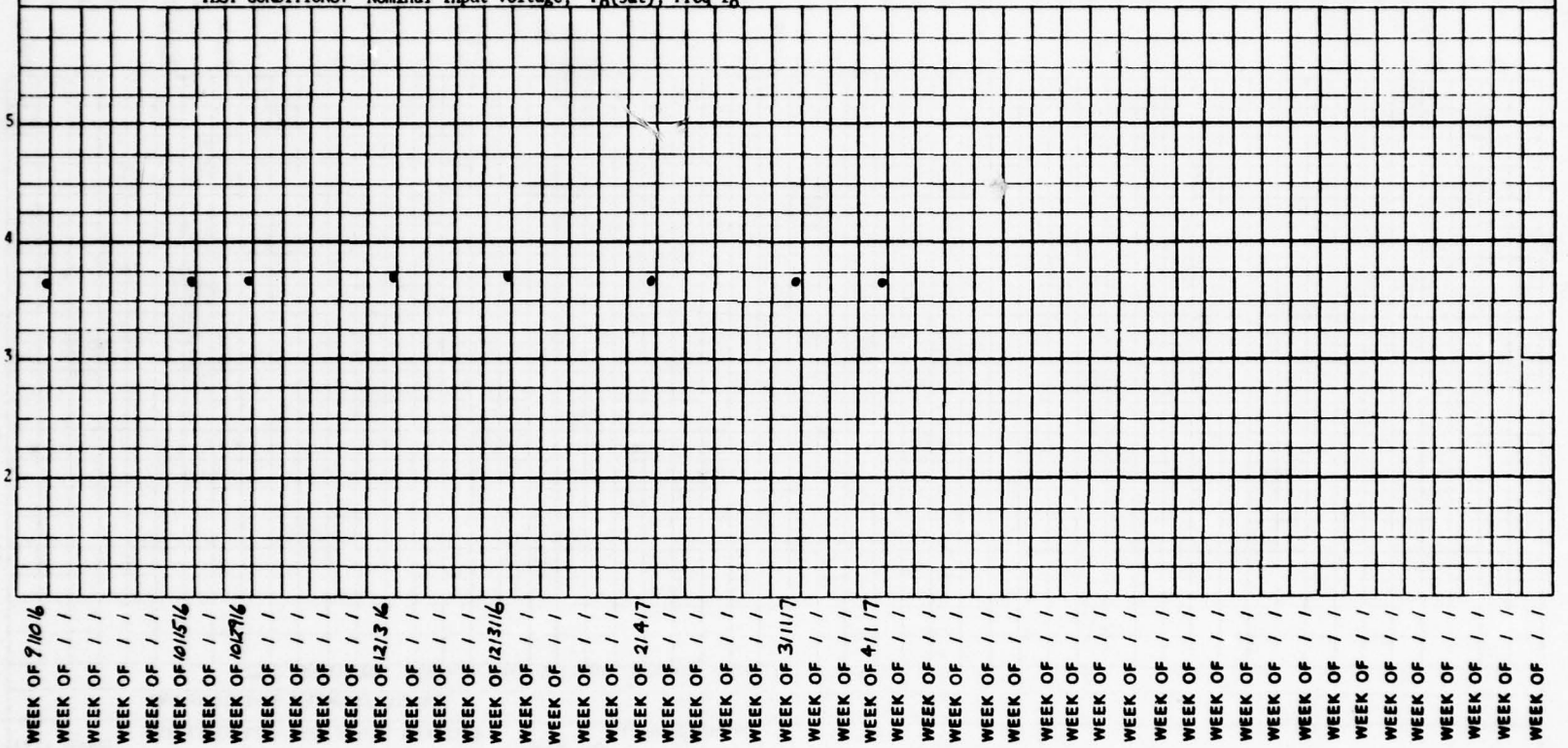
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$


CATHODE CURRENT TELEMETRY VOLTAGE (VOLTS)
5
4
3
2
WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
1100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-400 REV. ____
MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

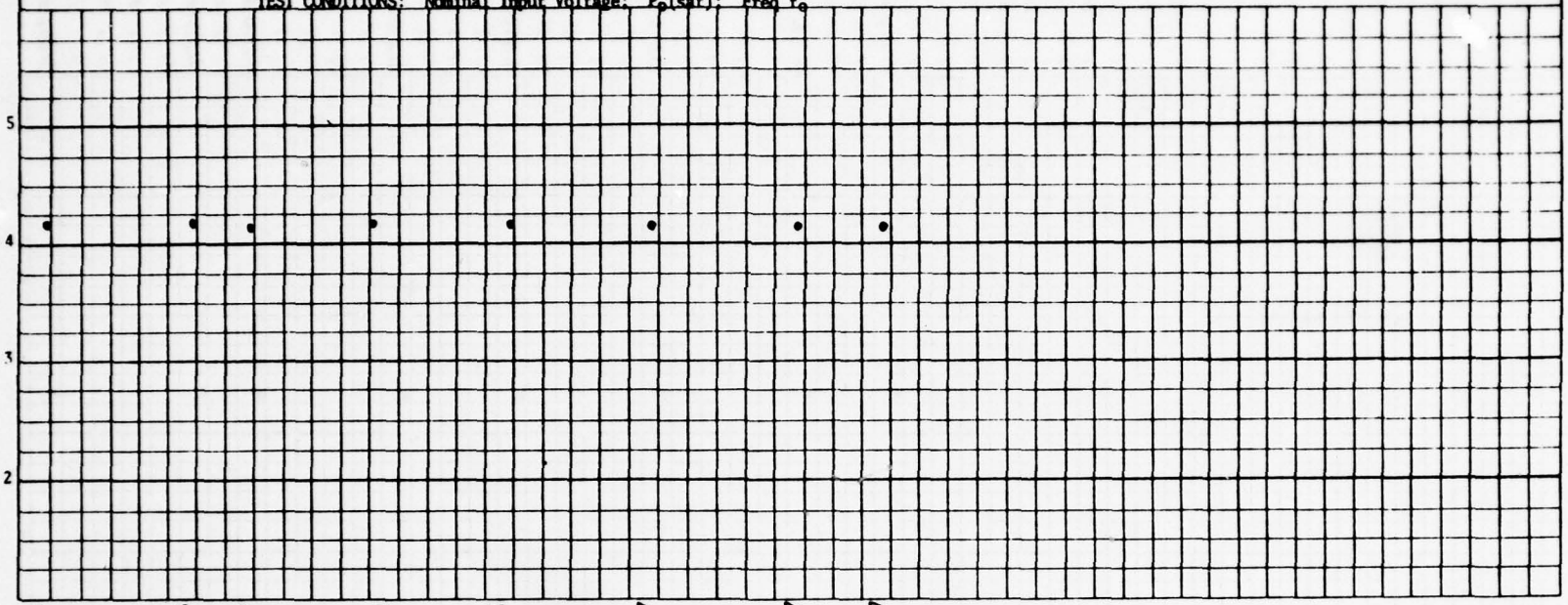
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

HEATER VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

HEATER VOLTAGE TELEMETRY VOLTAGE (VOLTS)


5
4
3
2
WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/16/16
WEEK CF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. ~~DCB200350-400~~ REV. _____

MODEL NO. ~~B200350-122~~ BZ00350-121 SERIAL NO. 22-3

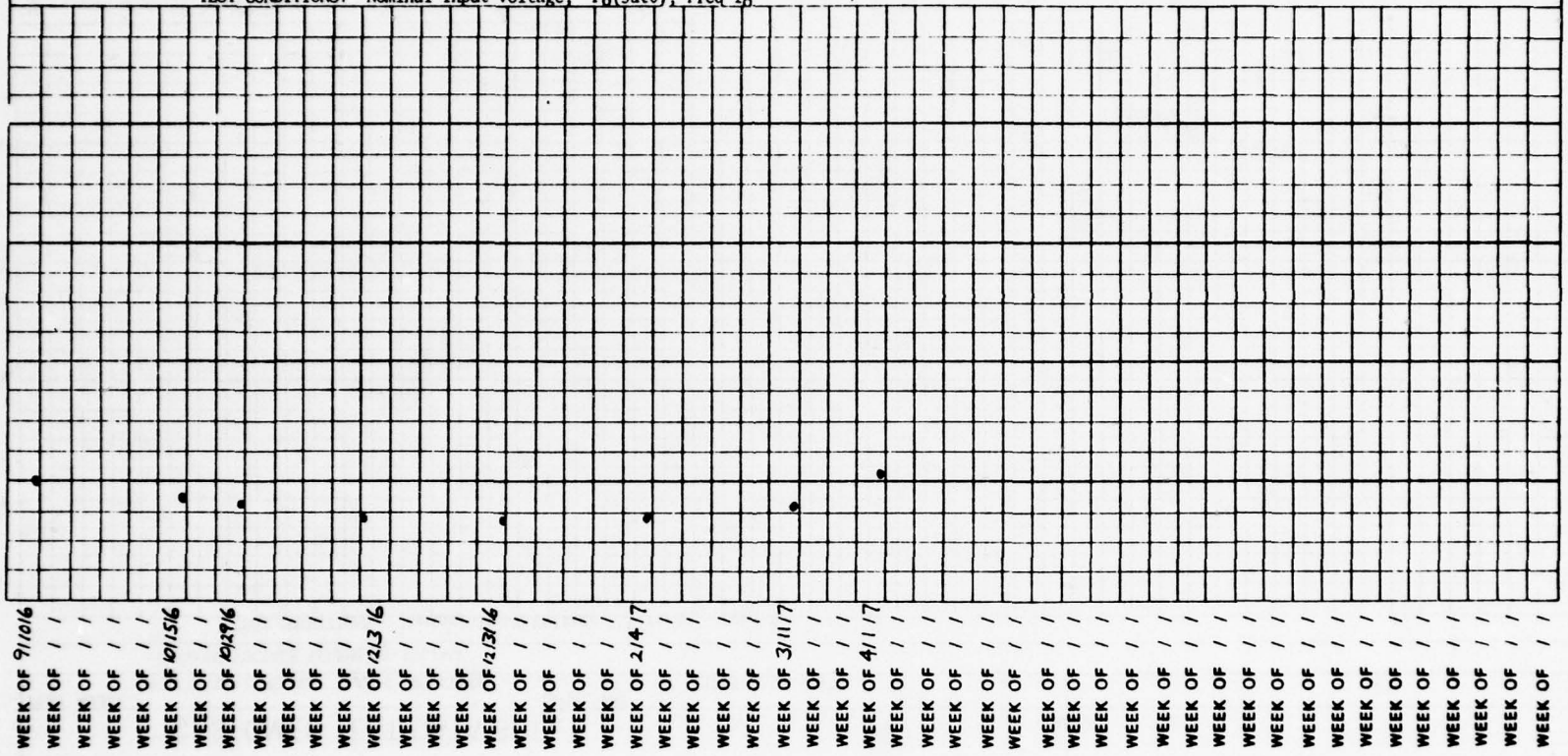
PAGE OF

# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

HELIX CURRENT TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat0); Freq $f_o$


HELIX CURRENT TELEMETRY VOLTAGE (VOLTS)
4
3
2
1
WEEK OF 9/10/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 10/15/16
WEEK OF / /
WEEK OF 10/29/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/3/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 12/31/16
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 2/4/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF 3/11/17
WEEK OF / /
WEEK OF / /
WEEK OF 4/1/17
WEEK OF / /
WEEK OF / /
WEEK OF / /
WEEK OF / /

HUGHES ELECTRON DYNAMICS DIVISION
3100 W. LOMITA BLVD. TORRANCE, CALIFORNIA 90509

DATA SHEET NO. DSB200350-4 00 REV. ___
MODEL NO. B200350-121 / B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

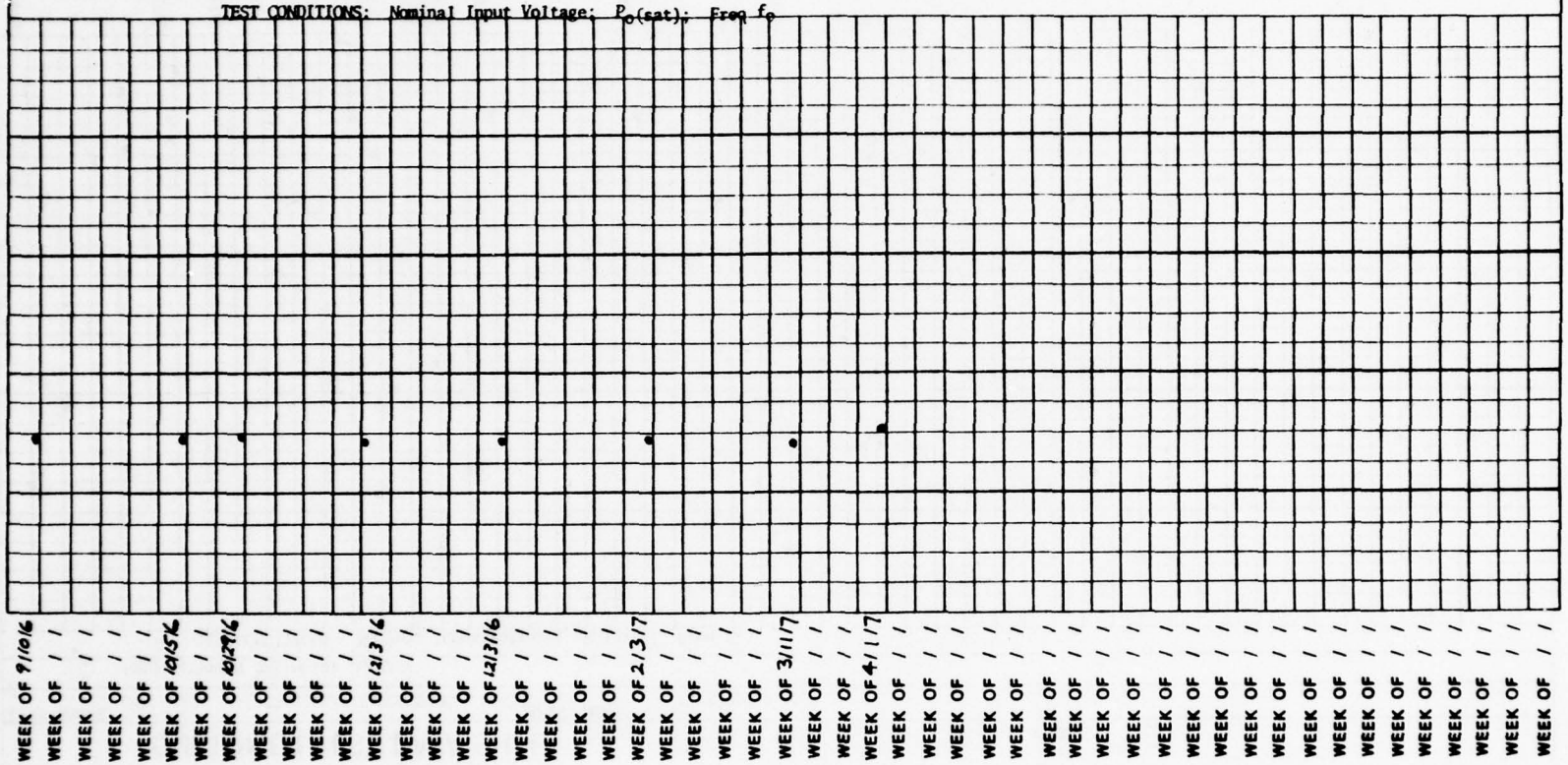
PAGE OF

TEST NAME: HIGH LEVEL LIFE TEST PLAN & PROCEDURE
SPEC. NO.: LTPB200350-400

CATHODE VOLTAGE TELEMETRY VOLTAGE

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$

CATHODE VOLTAGE TELEMETRY VOLTAGE (VOLTS)



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 ~~B200350-122~~ SERIAL NO. 22-3

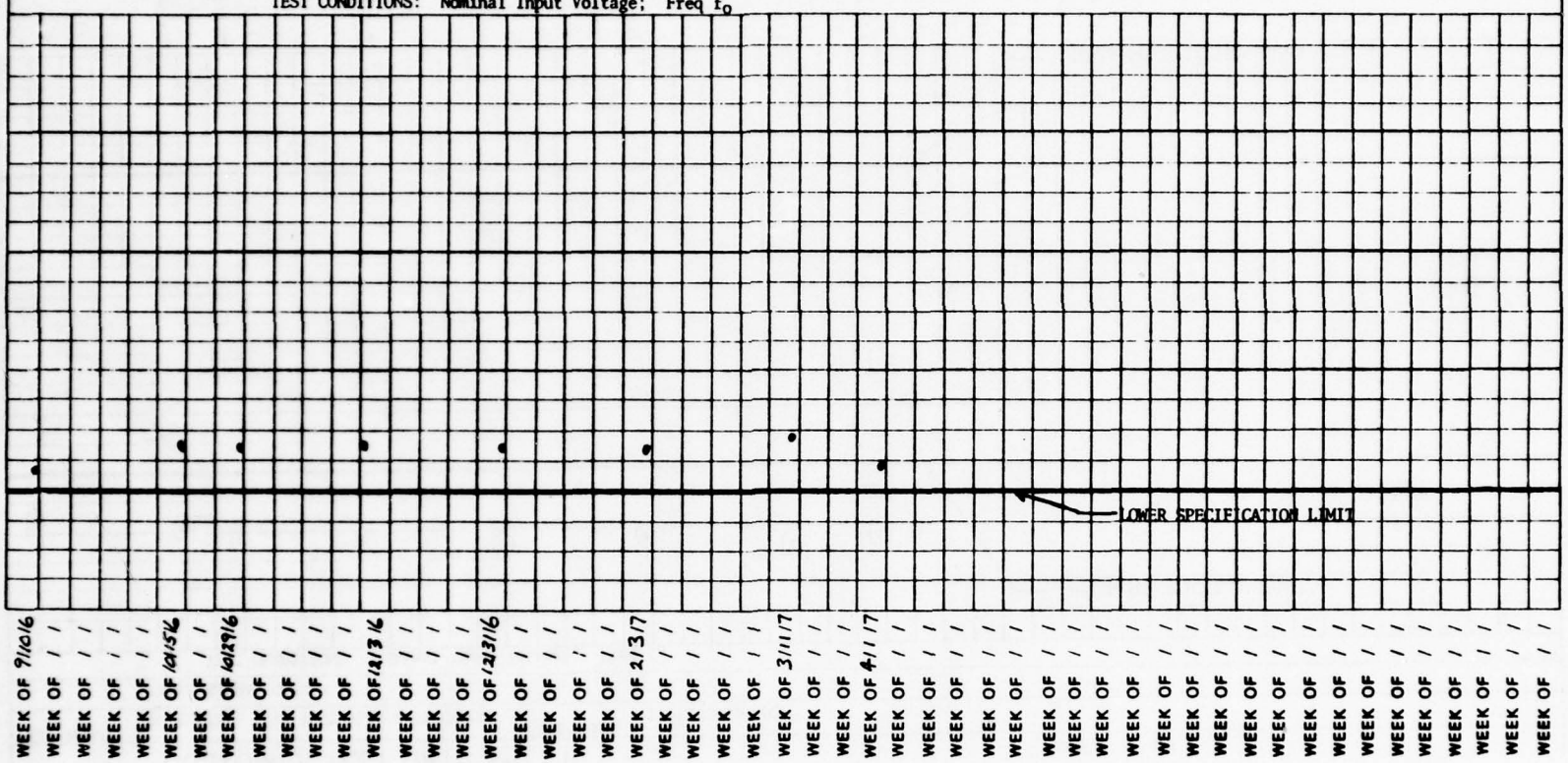
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE SPEC. NO. LTPB200350-400

SATURATED POWER OUTPUT

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB 200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

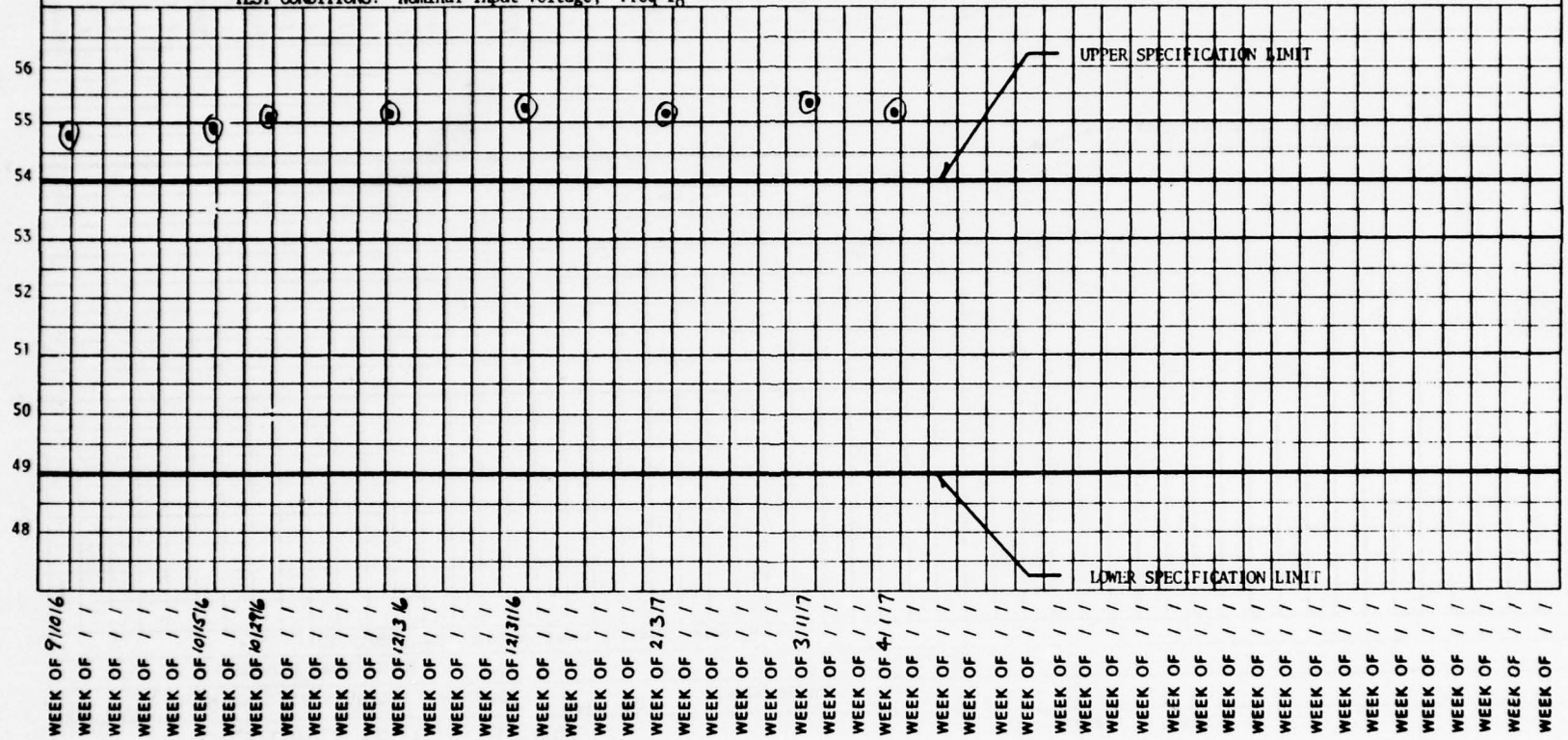
PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

SMALL SIGNAL GAIN

TEST CONDITIONS: Nominal Input Voltage; Freq $f_o$




⊙ OUT OF SPEC

HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

PAGE OF

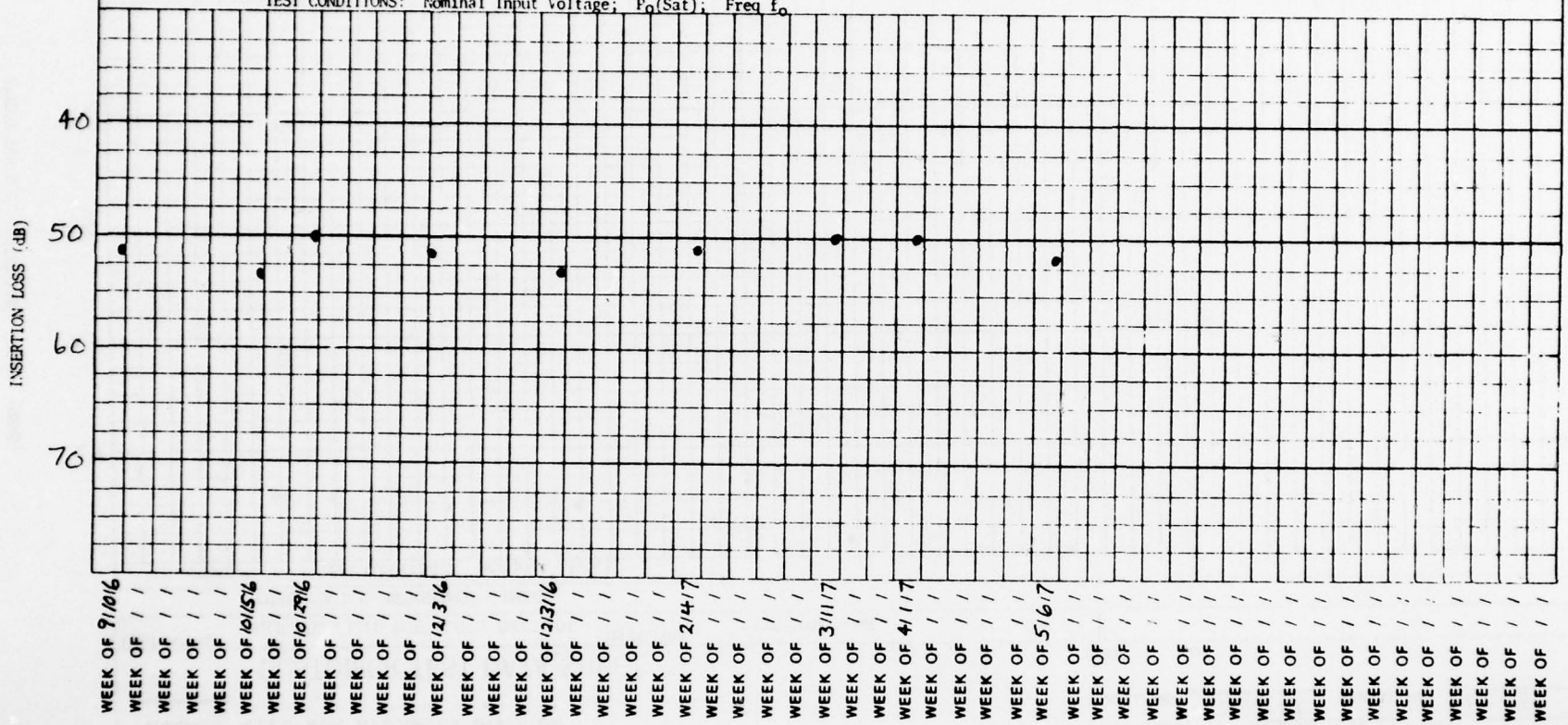
# CUSTOMER TEST DATA SHEET

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE

SPEC. NO. LTPB200350-400

ATTENUATOR INSERTION LOSS

TEST CONDITIONS: Nominal Input Voltage; $P_o$(Sat); Freq $f_o$



HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV.

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

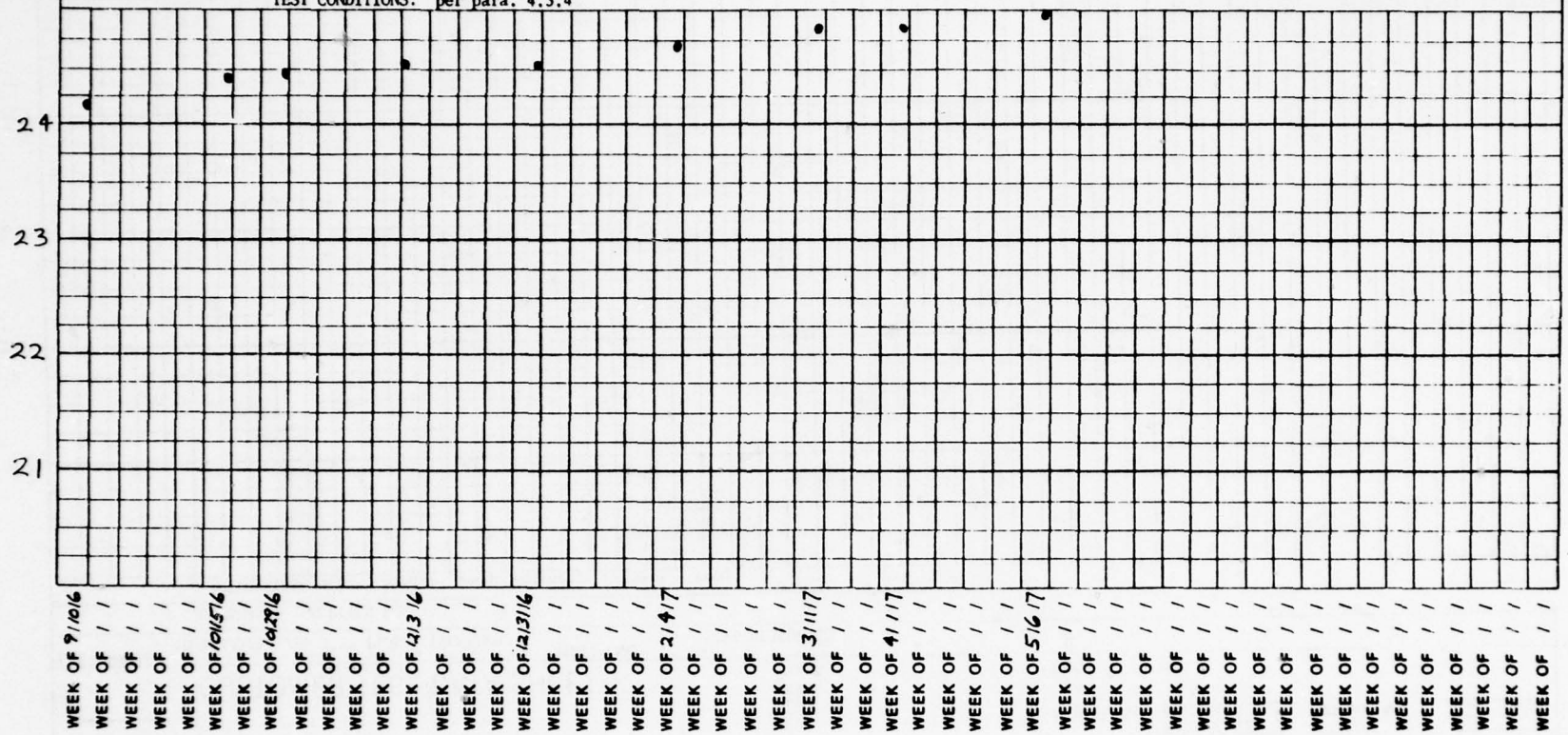
# CUSTOMER TEST DATA SHEET

PAGE OF

| TEST NAME | HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. | LTPB200350-400 |
|---|---|---|---|

ATTENUATOR D.C. RESISTANCE - INPUT

TEST CONDITIONS: per para. 4.3.4




D-208

ATTENUATOR D.C. RESISTANCE - INPUT (OHMS)

HUGHES **ELECTRON DYNAMICS DIVISION**

DATA SHEET NO. DSB200350-400 REV. ____

MODEL NO. B200350-121 B200350-122 SERIAL NO. 22-3

# CUSTOMER TEST DATA SHEET

PAGE OF

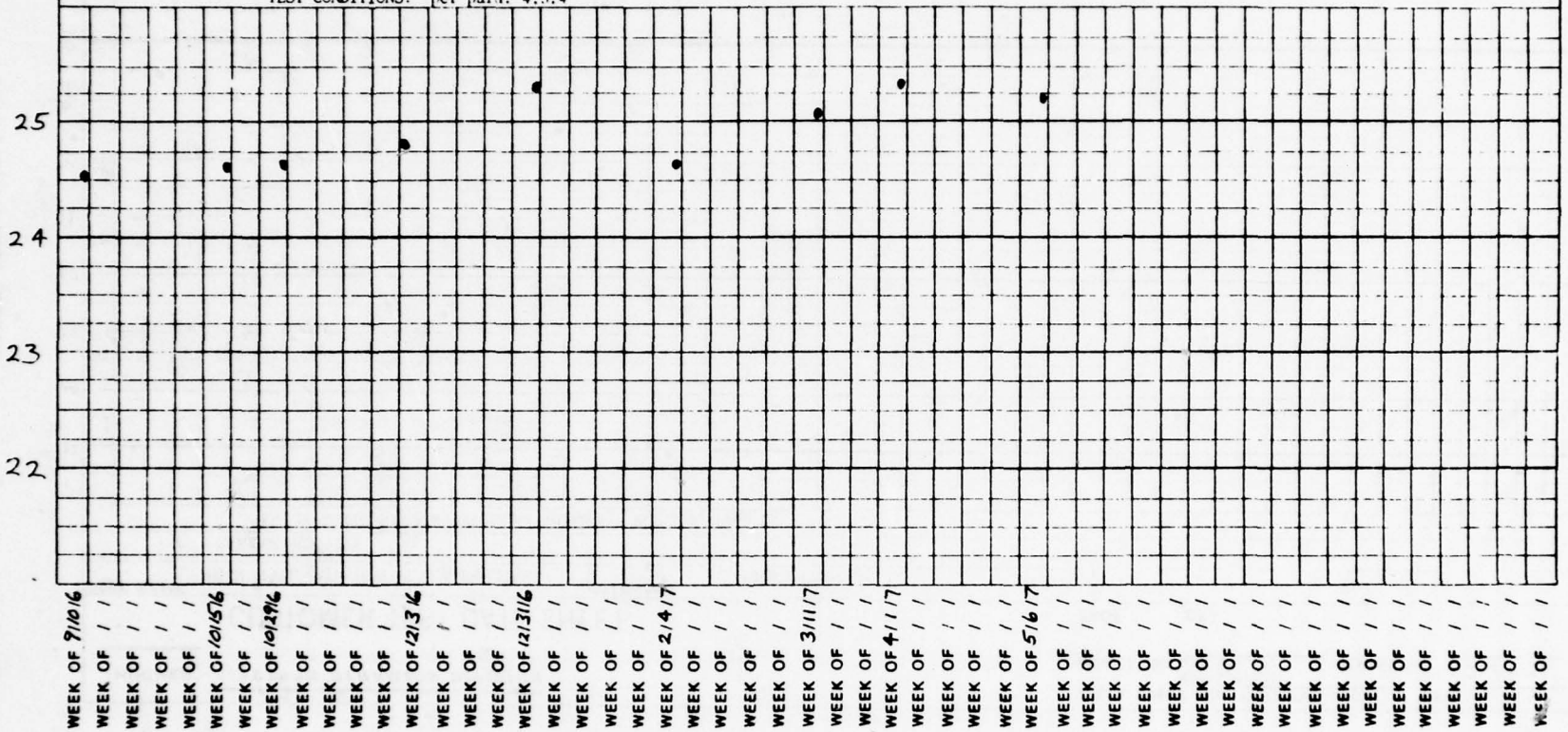
TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

ATTENUATOR D.C. RESISTANCE - OUTPUT

TEST CONDITIONS: per para. 4.3.4

602-D

ATTENUATOR D.C. RESISTANCE - OUTPUT (OHMS)



HUGHES ELECTRON DYNAMICS DIVISION

DATA SHEET NO. DSB200350-100 REV.
B200350-121
MODEL NO. B200350-122 SERIAL NO. 22-3

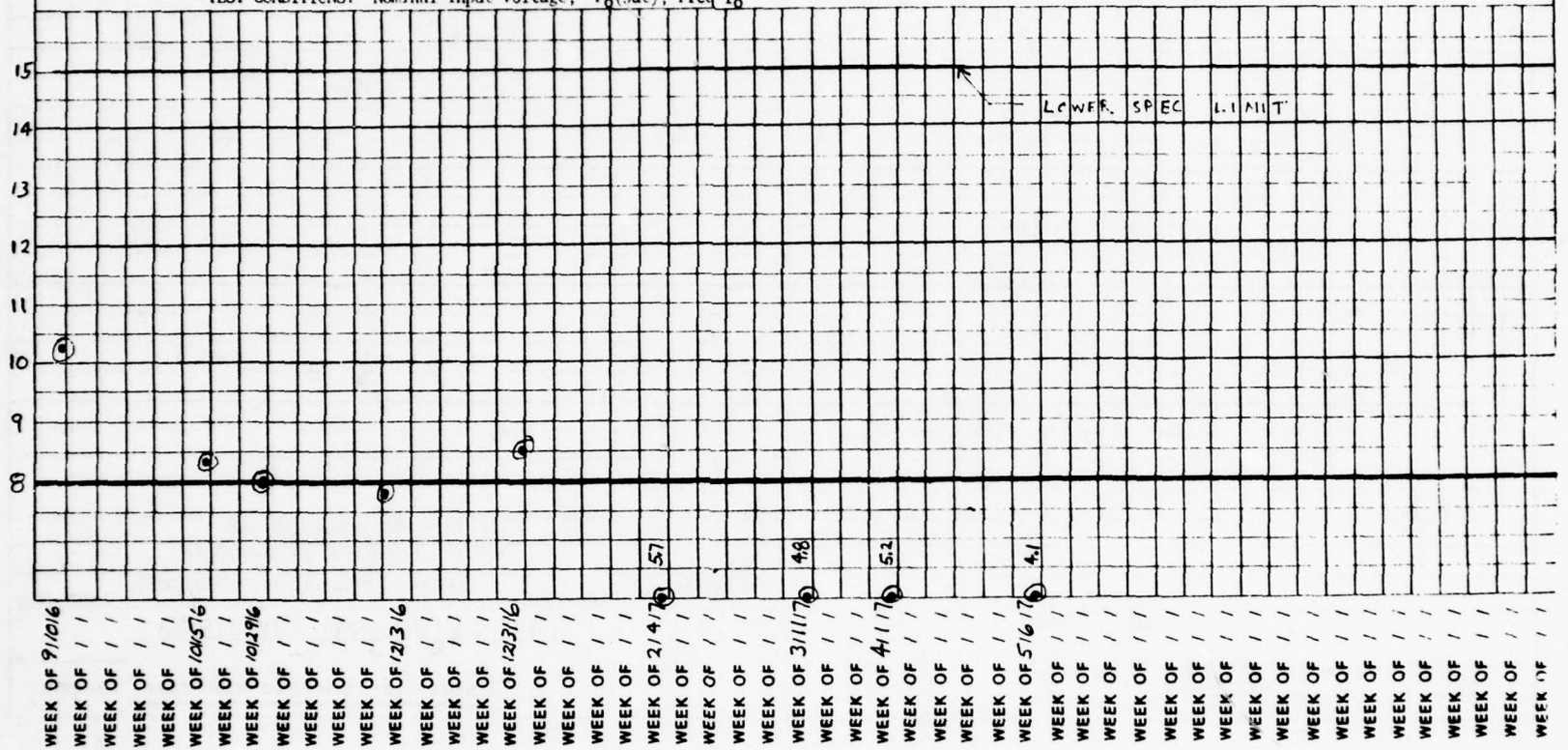
# CUSTOMER TEST DATA SHEET

PAGE OF

TEST NAME HIGH LEVEL LIFE TEST PLAN & PROCEDURE | SPEC. NO. LTPB200350-400

CATHODE ACTIVITY

TEST CONDITIONS: Nominal Input Voltage; $P_o$(sat); Freq $f_o$




⊙ OUT OF SPEC

# APPENDIX E

# CALIBRATION CURVES

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

TRW S/N 12-1 12024/1

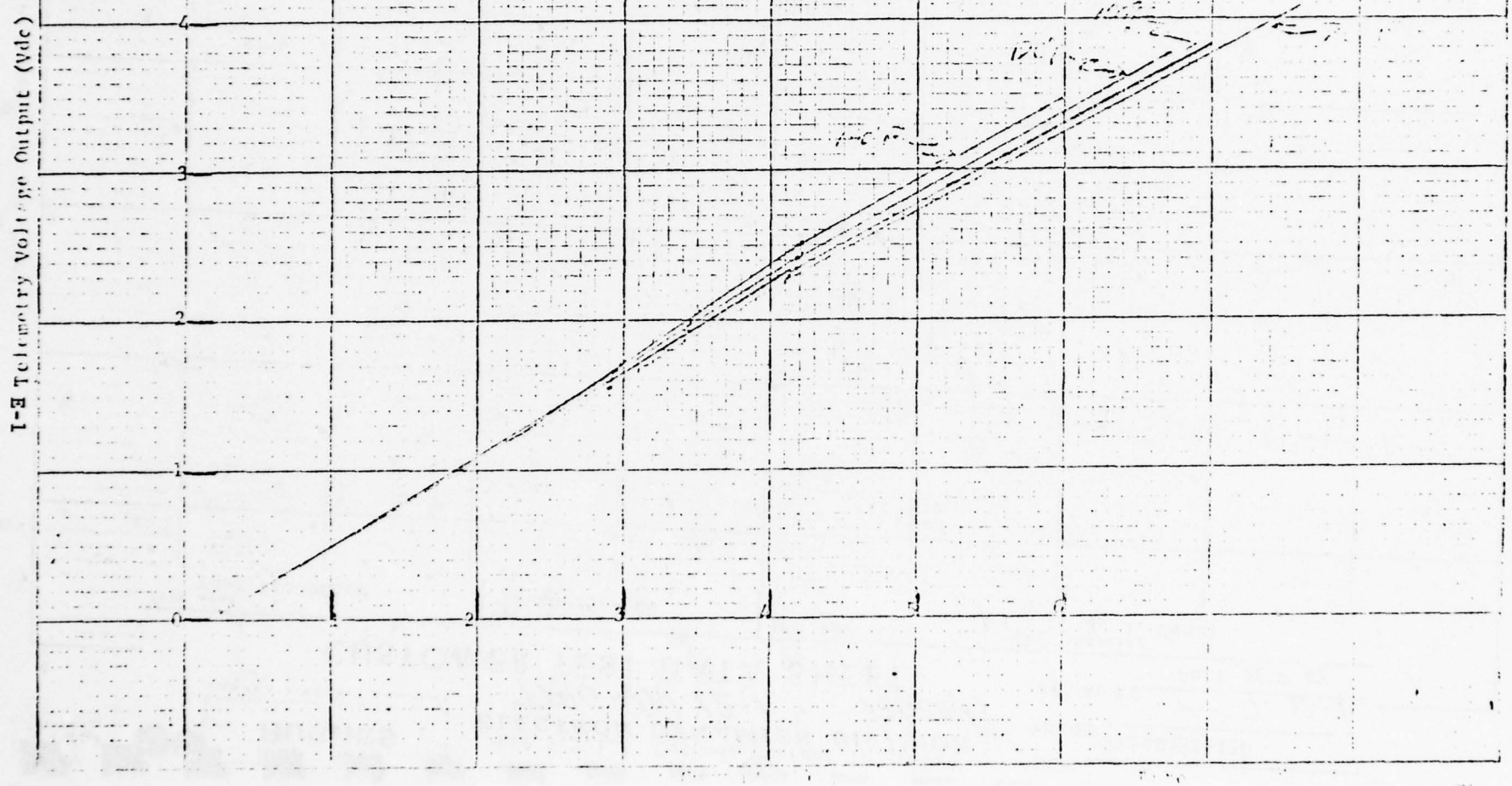
MODEL 1200352-120

SERIAL NO 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TP1200352-400 | | J. J. Haupt |



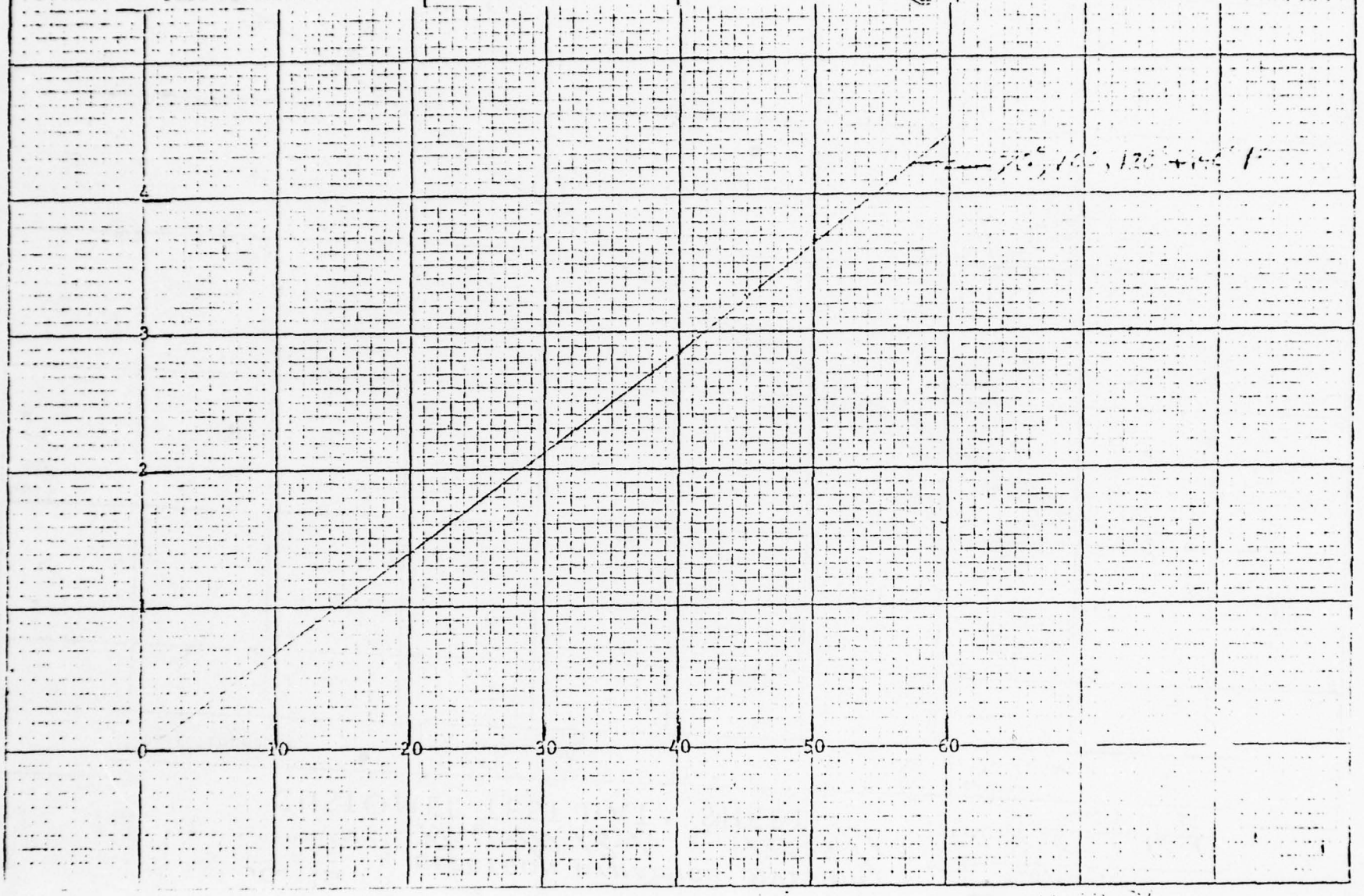
HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.2 Cathode Current Telemetry
ELECTRON DYNAMICS DIVISION
TRW S/N 12-1 12024#1

REV. K
MODEL B200352-120
SERIAL NO. 027 12-1


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 1 (LDU T 02) | J. J. Haupt |




Date

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

TRW S/N 12-1 1202H/1

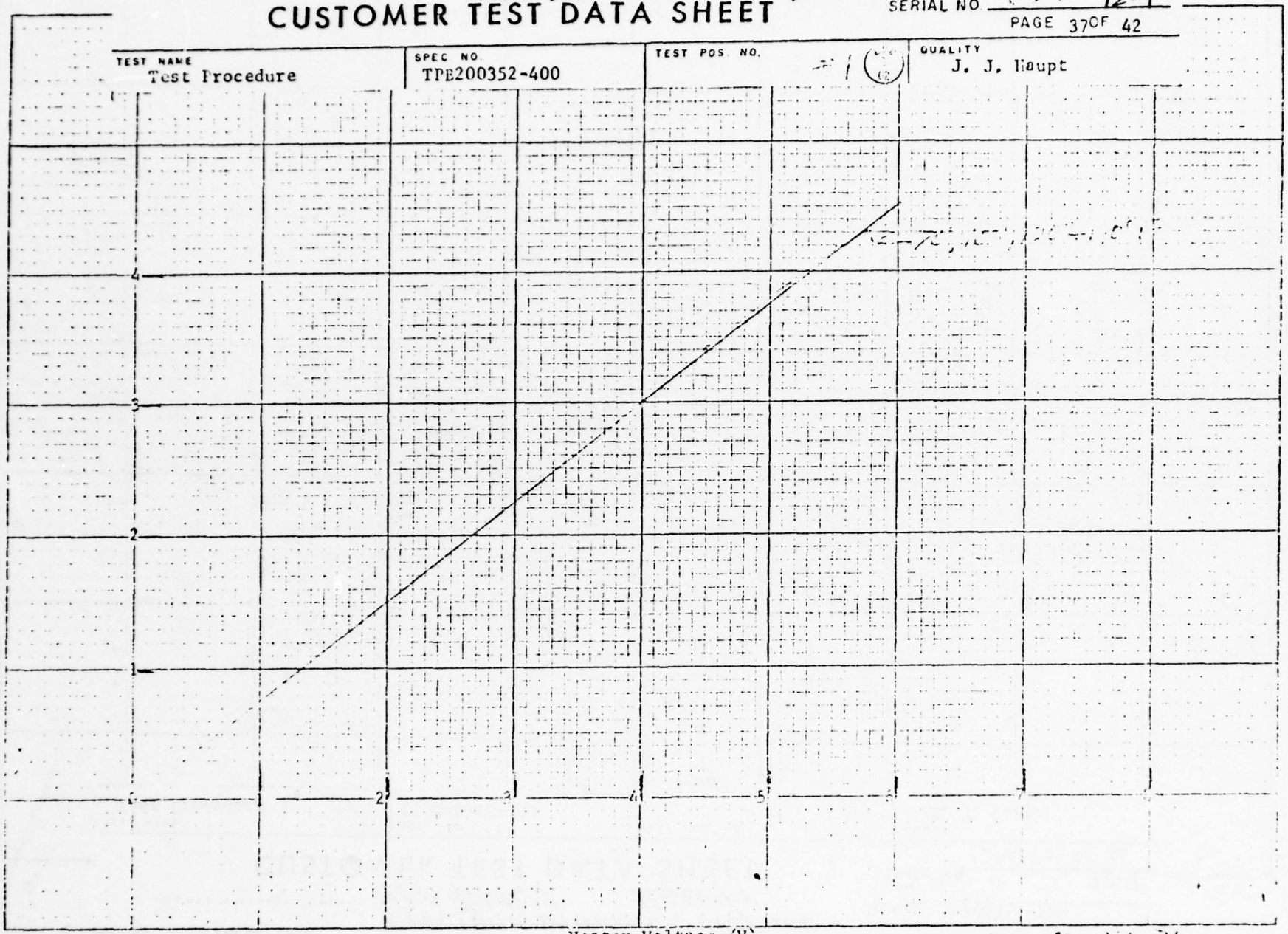
MODEL B200352-120

SERIAL NO. 001 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPE200352-400 | | J. J. Haupt |




Date 7 . 1 . 21

HUGHES
HUGHES AIRCRAFT COMPANY

For 5.3.1.4 Helix Current Telemetry and Overcurrent

ELECTRON DYNAMICS DIVISION

TRW SN 12-1 1202H/1

REV. K

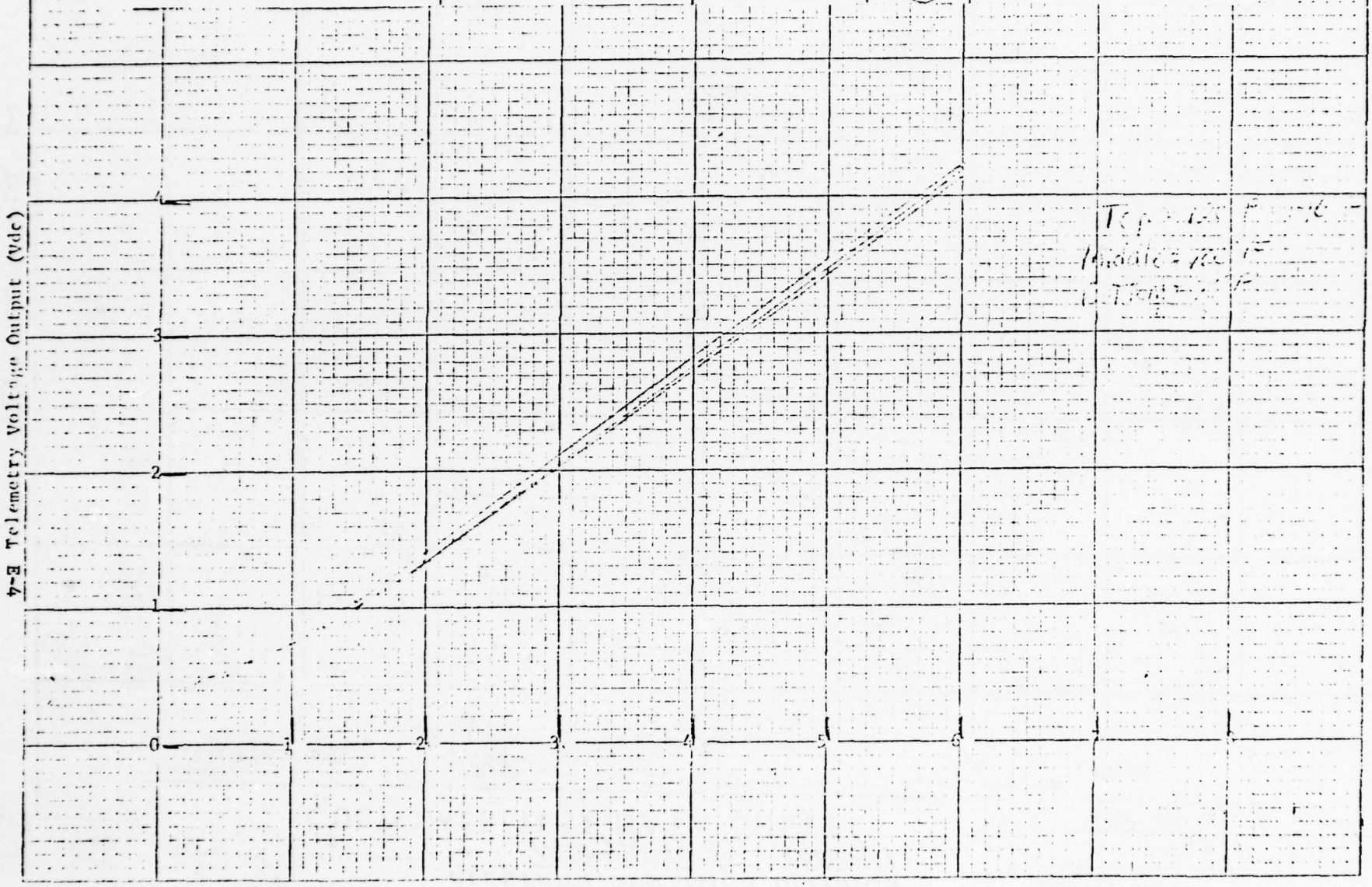
MODEL P200352-120

SERIAL NO. 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 1 | J. J. Haupt |



HUGHES
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Par 5.3.1.5 Cathode Voltage Telemetry

ELECTRON DYNAMICS DIVISION

TRW S/N 12-1 120244/1

REV K

MODEL B200352-120

SERIAL NO. 037 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | -27 | J. J. Haupt |

S-E Telemetry Voltage Output (Vdc)

4
3
2
1
0

3300 3500 3700 3900 4100 4300

$I_W$ = 25 mA

Date

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

TRW S/N 12-1 12524/1

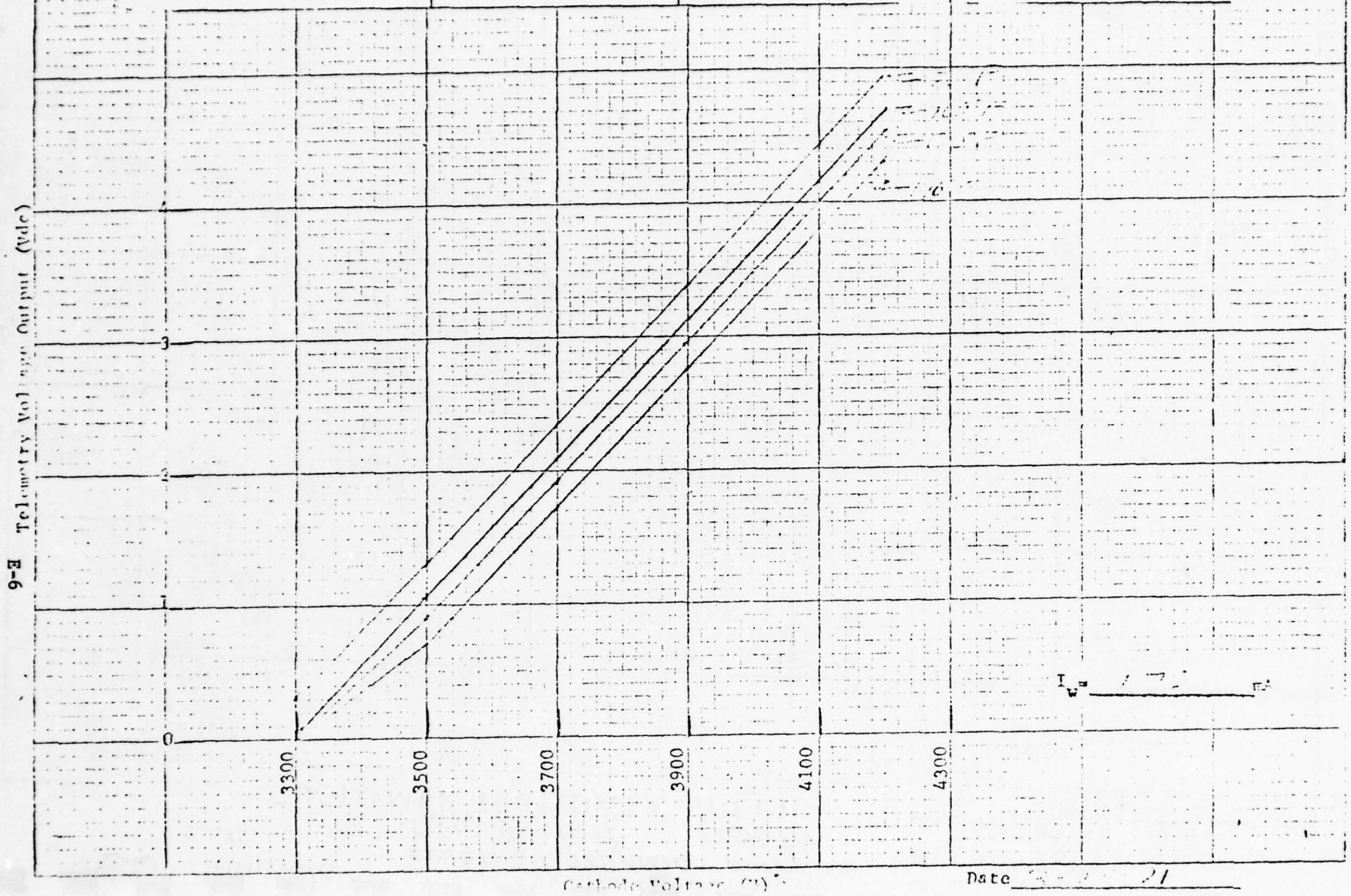
MODEL B200352-120

SERIAL NO C37 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TIB200352-400 | 1 | J. J. Haupt |




$I_{K_2}$ = 17 mA

Date 7-21

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

TRW S/N 12-1 12024/1

REV.

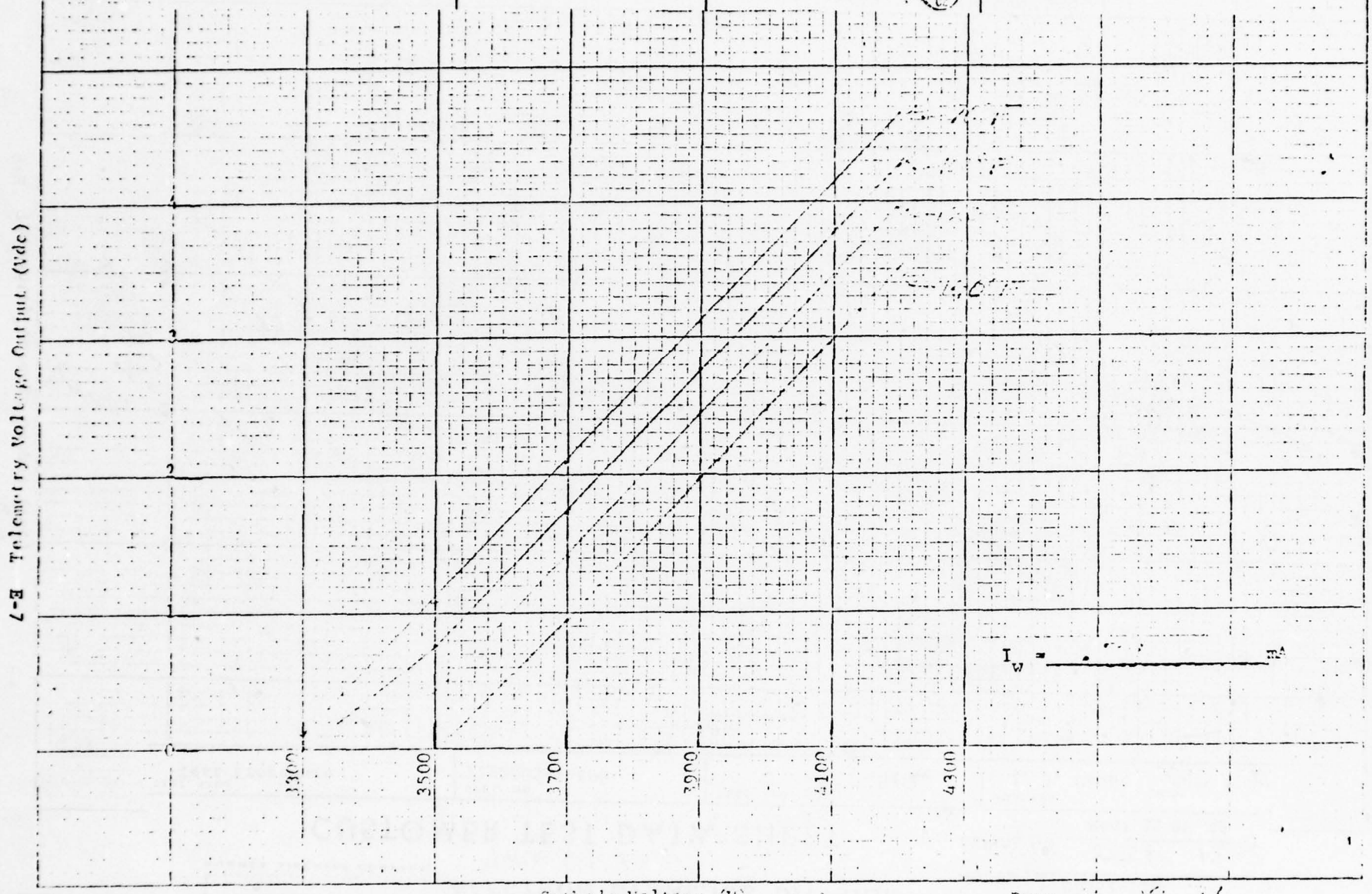
MODEL B200352-120

SERIAL NO. 7 12-1



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | | J. J. Haupt |




$I_w$ = _____ mA

Date _____

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

REV. A

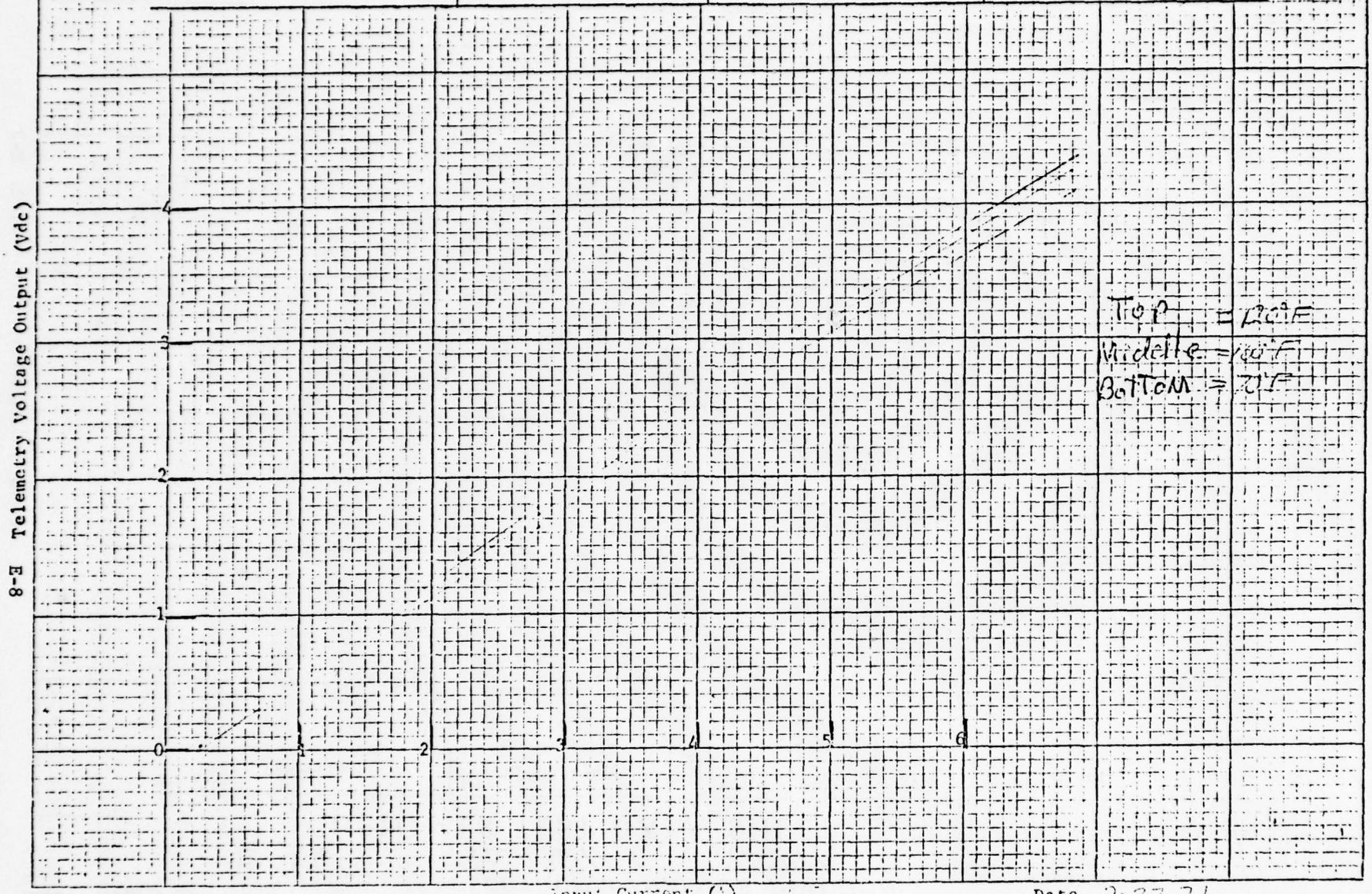
MODEL B200352-120

SERIAL NO. 031 12-2

PAGE 35 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPE200352-400 | #2 | J. J. Haupt 2-22-71 |




Date 2-22-71

HUGHES
HUGHES AIRCRAFT COMPANY

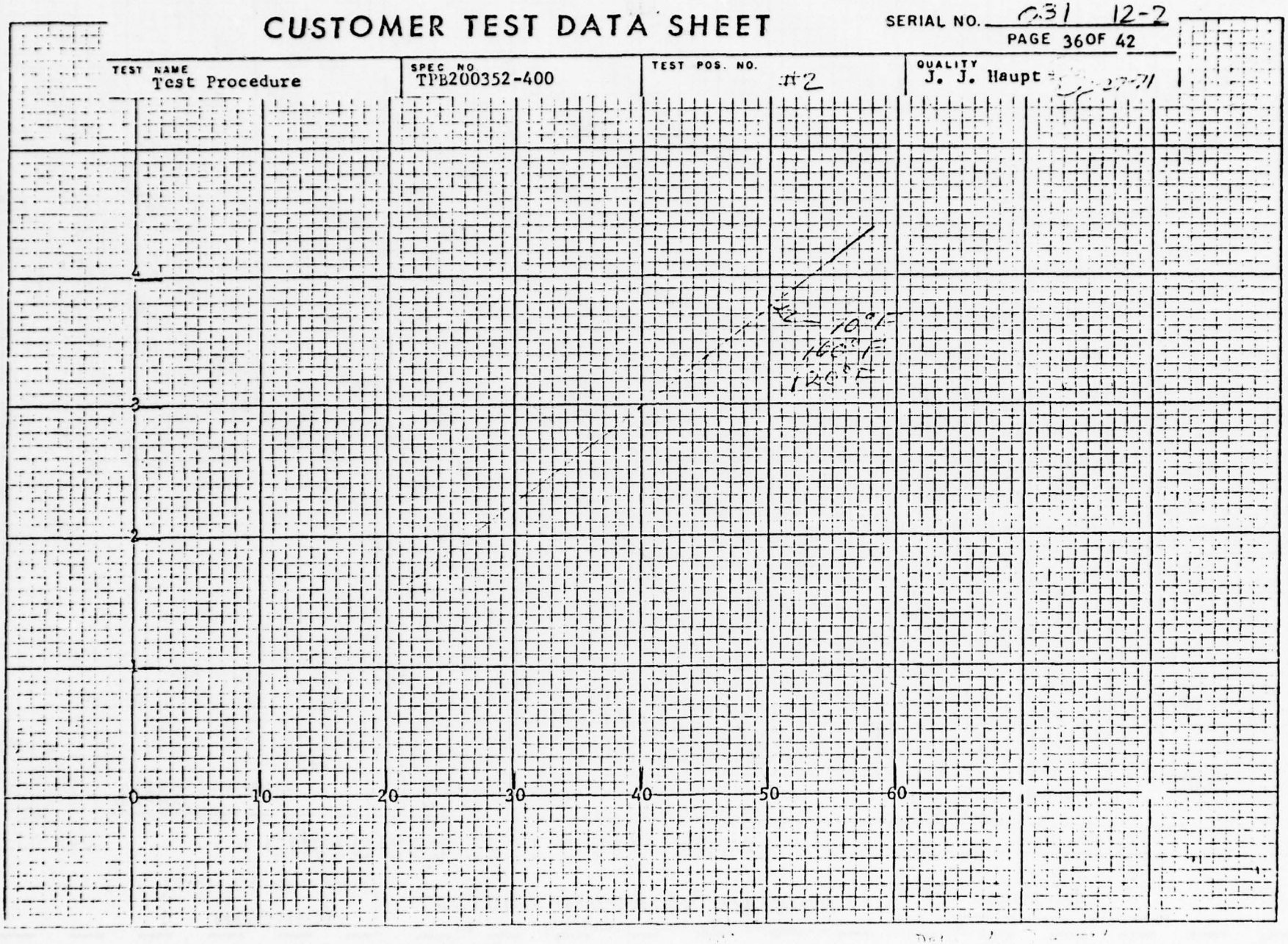
Par 5.3.1.2 Cathode Current Telemetry
ELECTRON DYNAMICS DIVISION

REV. K
MODEL B200352-120
SERIAL NO. 031 12-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #2 | J. J. Haupt 2-27-71 |



HUGHES
HUGHES AIRCRAFT COMPANY

For 5.3.1.3 Heater Voltage Telemetry

ELECTRON DYNAMICS DIVISION

REV. K

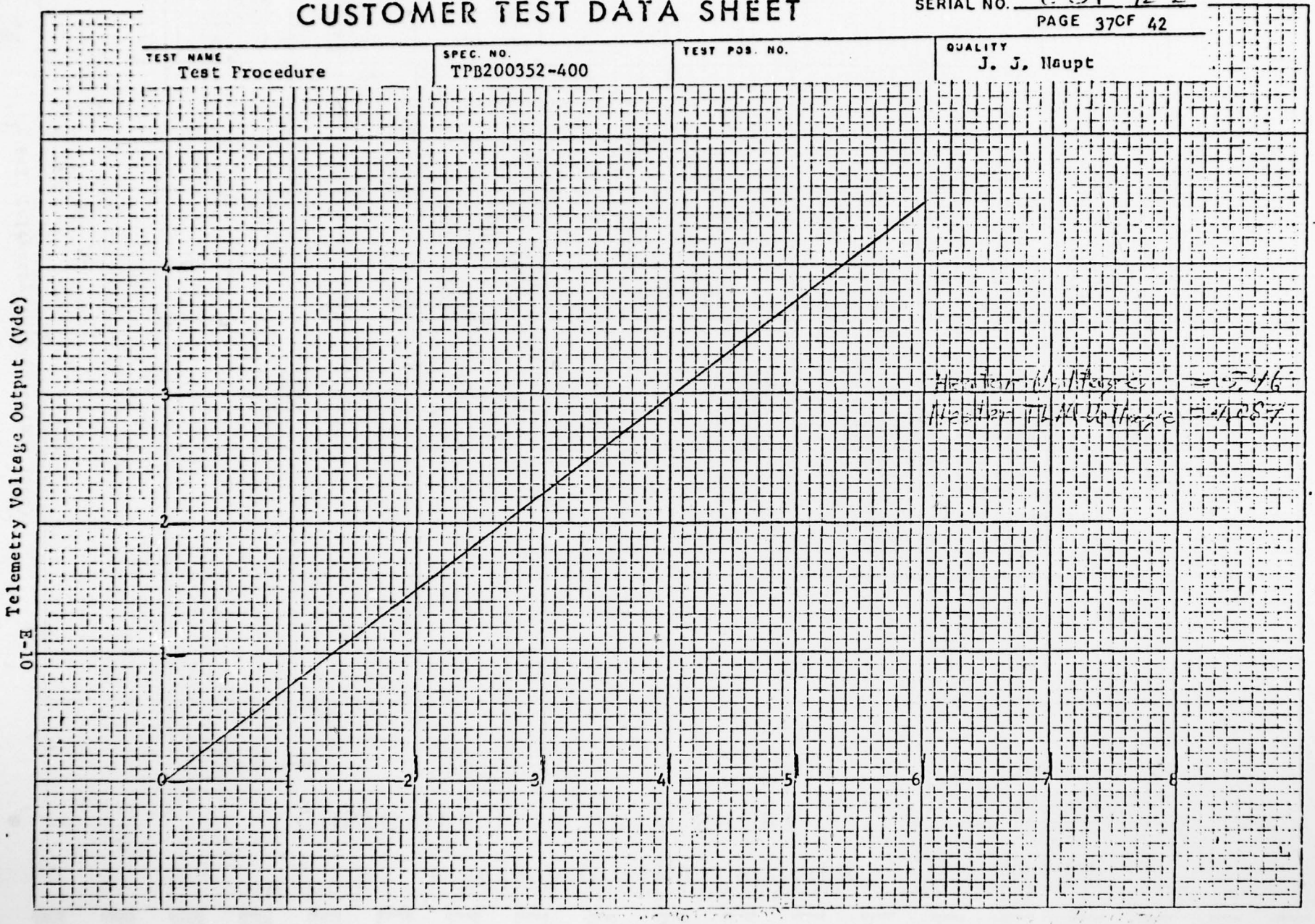
MODEL B200352-120

SERIAL NO. 031 12-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | | J. J. Haupt |




Heater Hi Voltage = 3.46

Heater Hi Voltage = 4.85

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

Tar 5.3.1.4 Helix Currer. Telemetry and Overcurrent

REV. K

MODEL P200352-120

SERIAL NO. 031 12-2



# CUSTOMER TEST DATA SHEET

| Test Procedure | SPEC NO. TPE200352-400 | TEST POS. NO. #2 | QUALITY J. J. Haupt |
|---|---|---|---|

II-2 Telemetry Voltage Output (Vdc)

Top = 120°F

Middle = 100°F

Bottom = 70°F

3

2

1

0 1 2 3 4 5 6 8

HUGHES
HUGHES AIRCRAFT COMPANY

Far 5.3.1.5 Cathode ...tage Telemetry
ELECTRON DYNAMICS DIVISION

REV.
MODEL B200352-120
SERIAL NO. 031 12-2


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #2 | J. J. Haupt 2-22-71 |

Top = 70°F
Middle = 100°F
Bottom = 120°F

$I_w$ = .62 mA

E-12

Telemetry Voltage Output (Vdc)

4
3
2
1
0

3300 3500 3700 3900 4100 4300

Cathode Voltage (V)

Date 2-22-71

HUGHES AIRCRAFT COMPANY

**ELECTRON DYNAMICS DIVISION**

REV. K

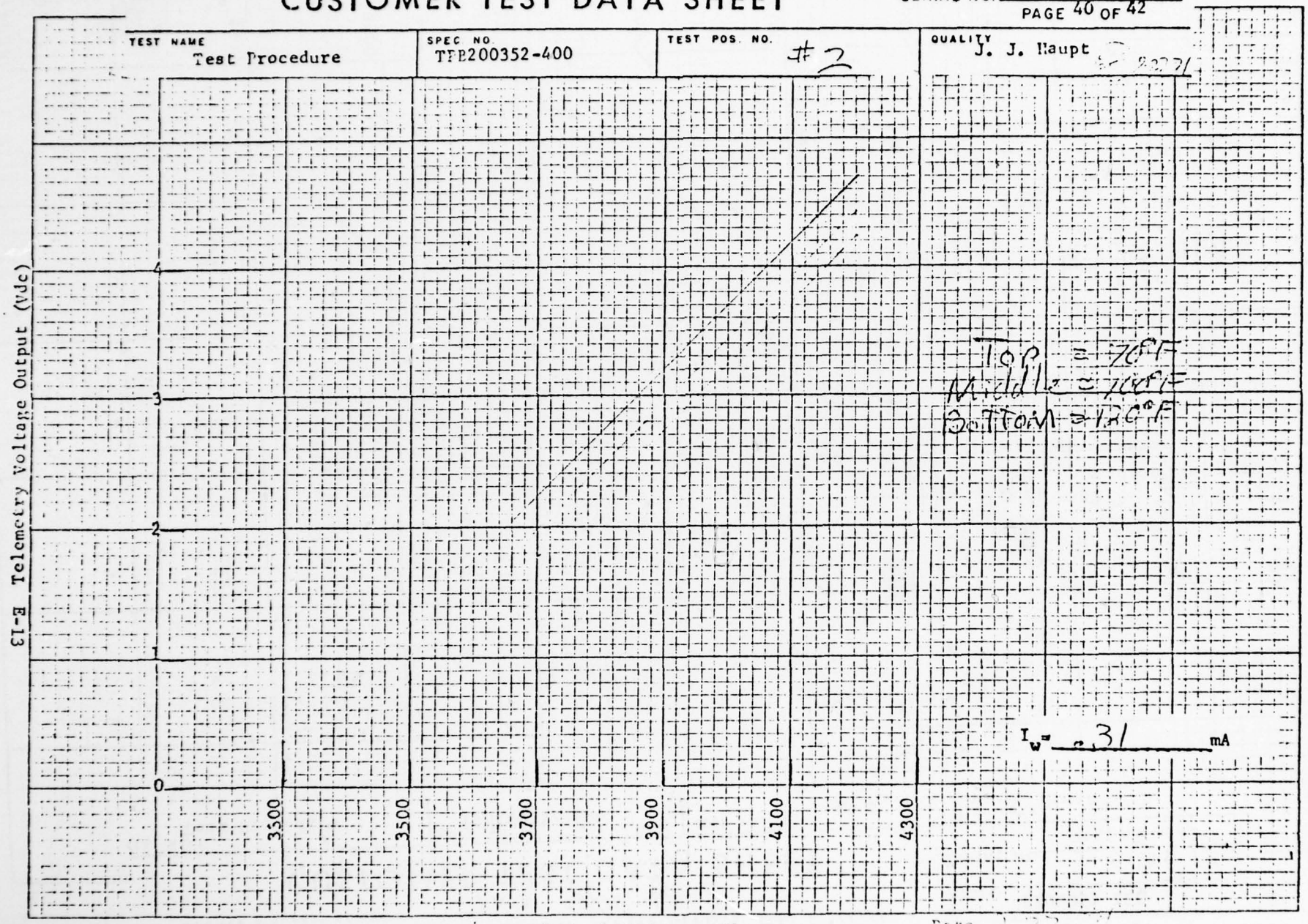
MODEL B200352-120

SERIAL NO. 031 12-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #2 | J. J. Haupt |




Top = 76°F

Middle = 100°F

Bottom = 120°F

$I_w$ = .31 mA

HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.5 Cathode Voltage Telemetry
ELECTRON DYNAMICS DIVISION
Title S/N 12-2

# CUSTOMER TEST DATA SHEET

D[redacted]HEE[redacted]035[redacted]0
REV. K
MODEL B200352-120
SERIAL NO. 031 12-2


| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPE200352-400 | #2 | J. J. Haupt 2274 |

Top = 70° F
Middle = 100° F
Bottom = 120° F

$I_w$ = 1.62 mA

E-14 Telemetry Voltage Output (Vdc)

4
3
2
1
0

3300 3500 3700 3900 4100 4300

HUGHES AIRCRAFT COMPANY ELECTRON DYNAMICS [illegible]

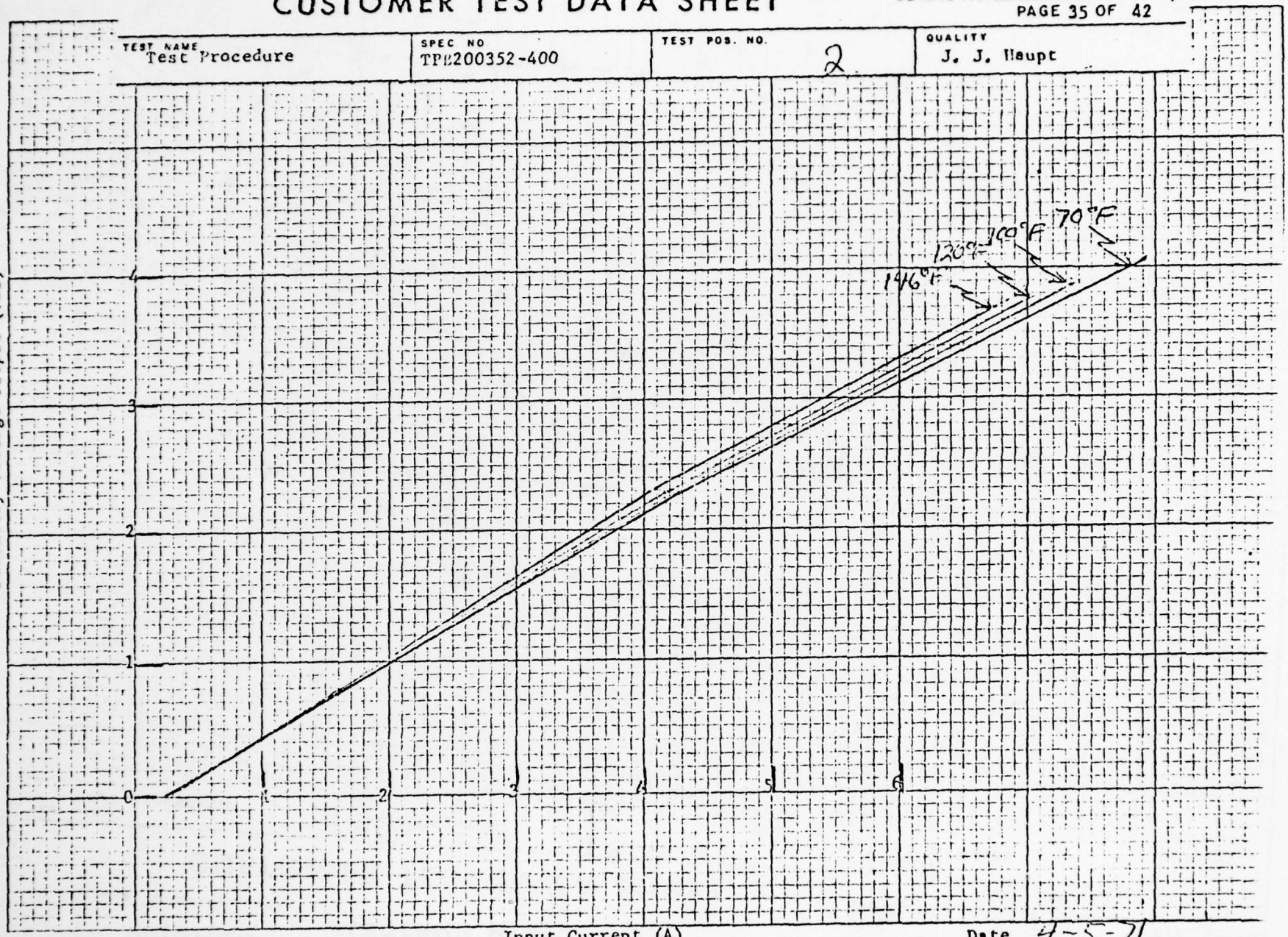
MODEL

SERIAL NO. 030 S/N 12-

PAGE 35 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TP8200352-400 | 2 | J. J. Haupt |




Date 4-5-71

E-15

HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.2 Cathode Current Telemetry
ELECTRON DYNAMICS DIVISION

DATE SHEET [redacted] 24

REV. K

MODEL B200352-120

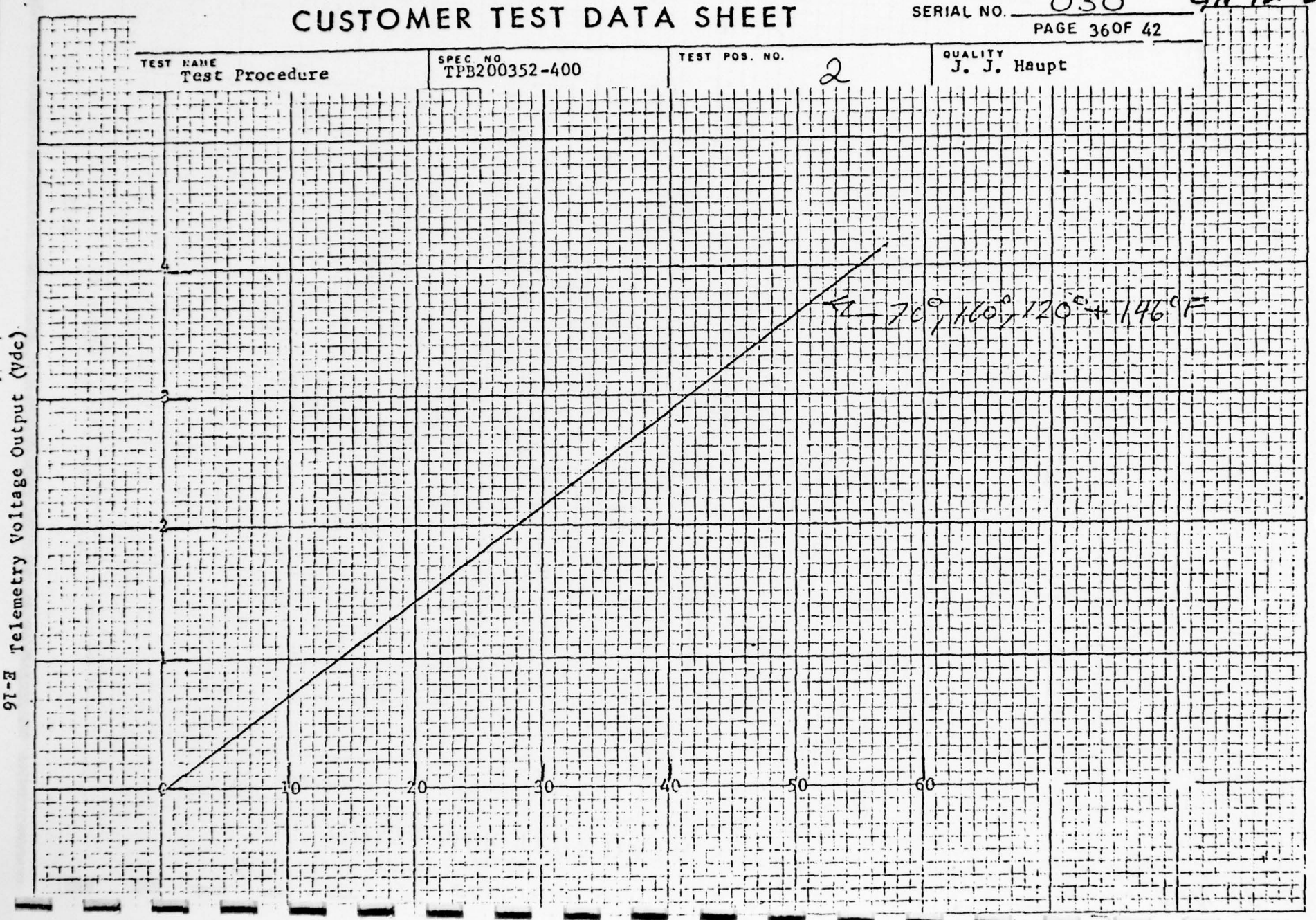
1202H-1
S/N 12-3

SERIAL NO. 030

PAGE 360F 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |

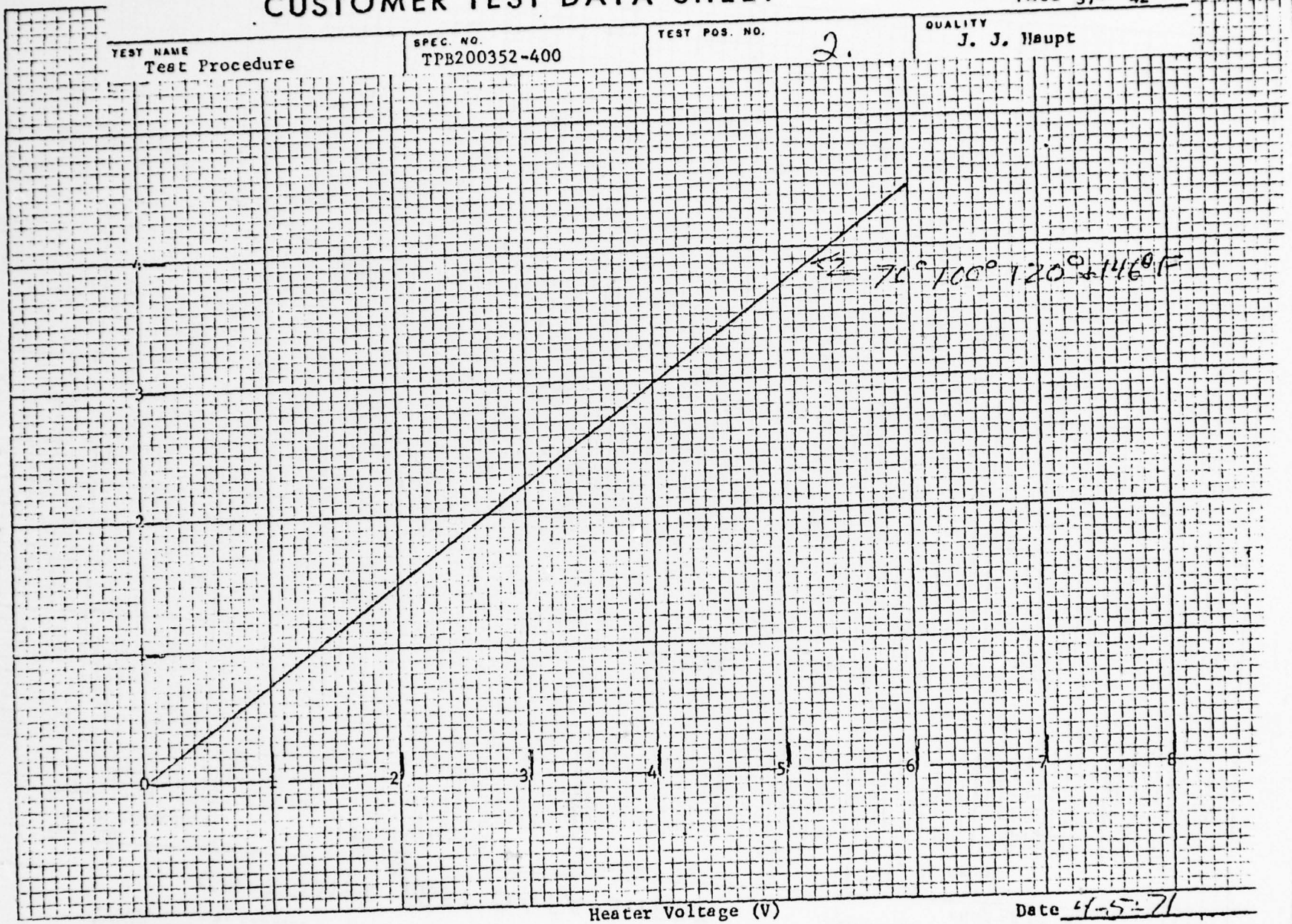


HUGHES
HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS D...

# CUSTOMER TEST DATA SHEET

SERIAL NO. 030 12-3


| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2. | J. J. Haupt |




Date 4-5-71

E-17

HUGHES AIRCRAFT COMPANY ELECTRON DYNAMICS DIVISION

MODEL PB200352-400

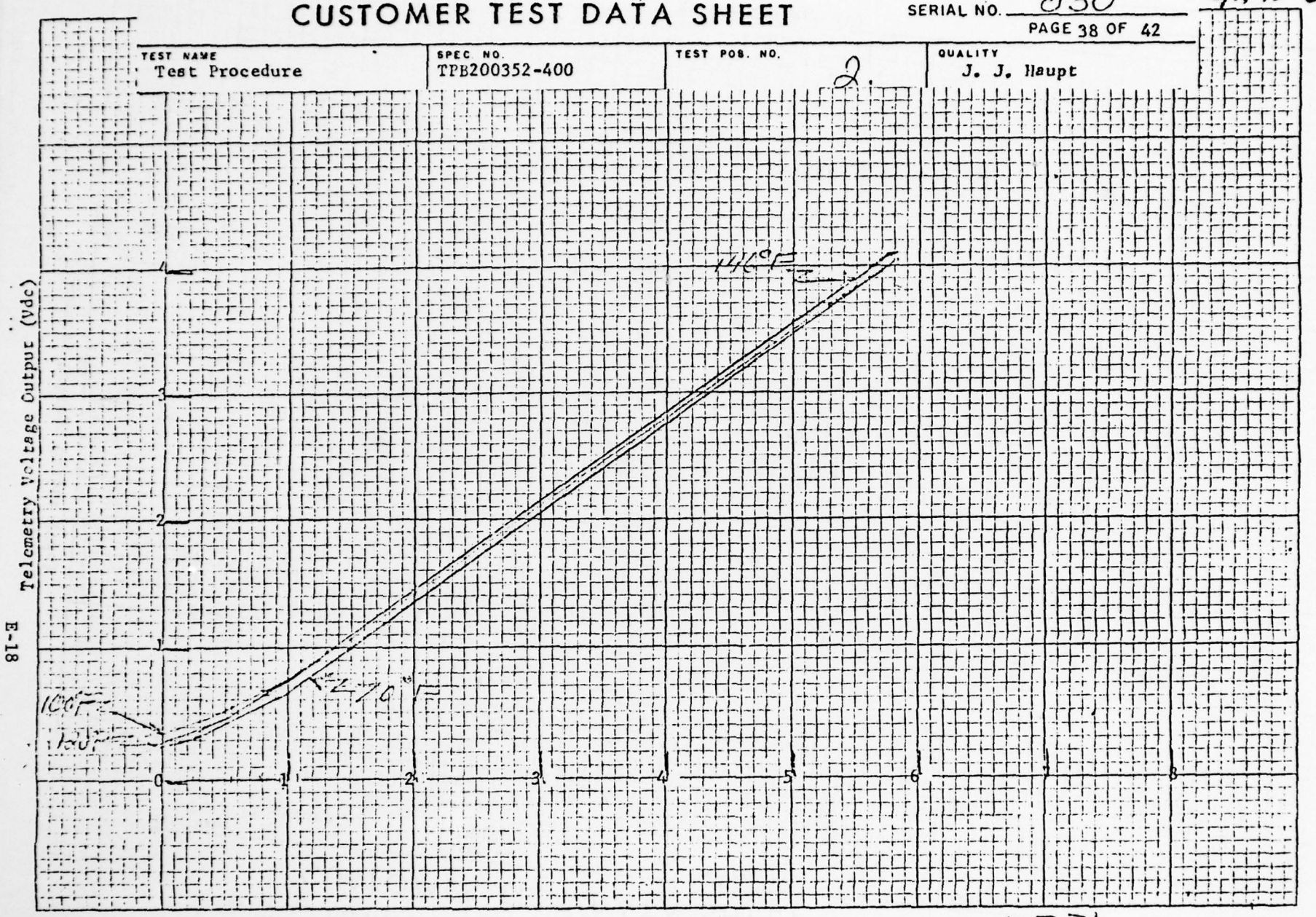
SERIAL NO. 030

S/N 12-3

# CUSTOMER TEST DATA SHEET



| TEST NAME | SPEC NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2. | J. J. Haupt |




Date 4-5-71

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

MODEL B200352-120

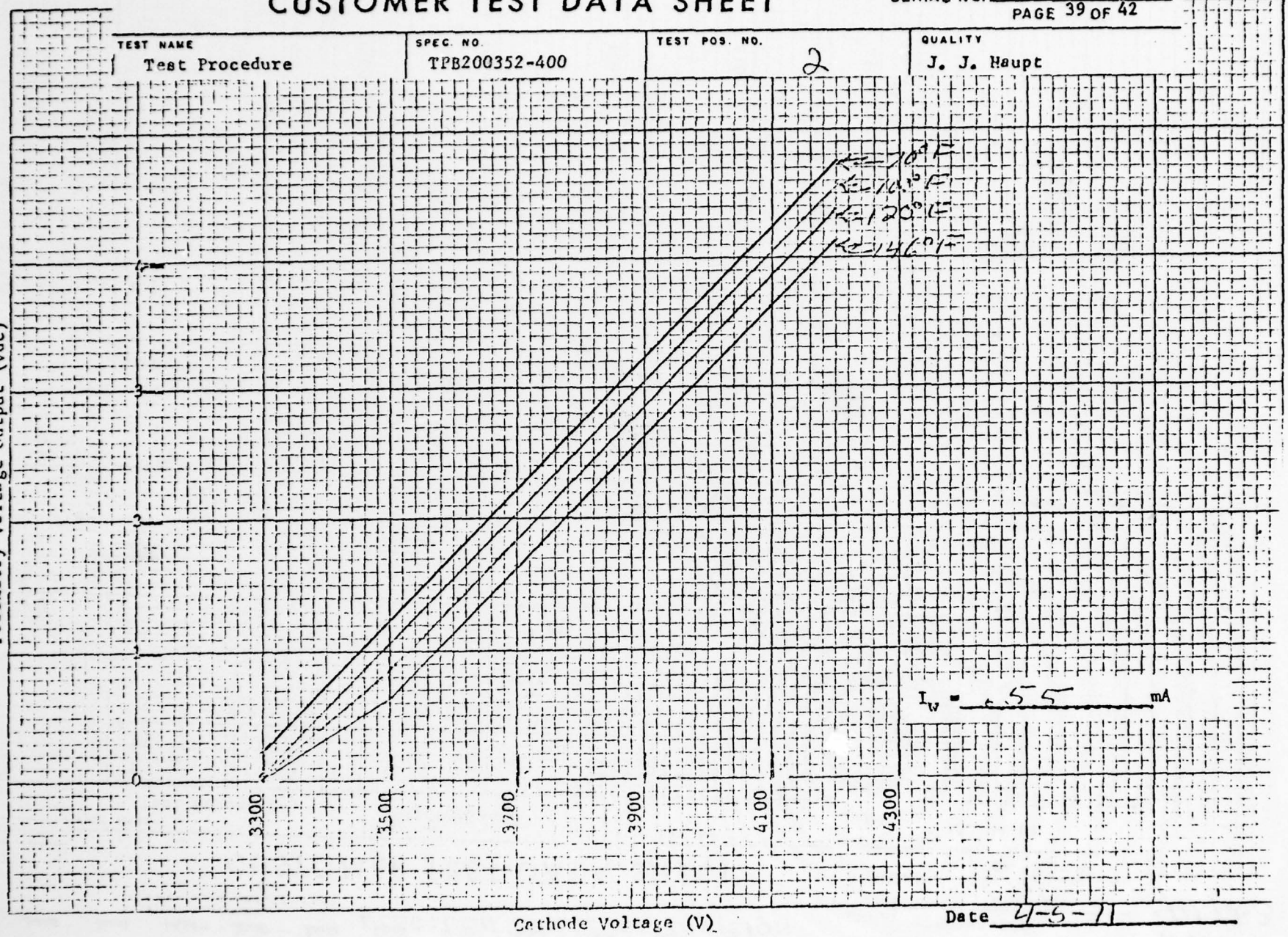
S/N 12-

SERIAL NO. 030



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |




$I_w$ = .55 mA

Date 4-5-71

HUGHES AIRCRAFT COMPANY — ELECTRON DYNAMICS DIVISION

R _____ 120271-1

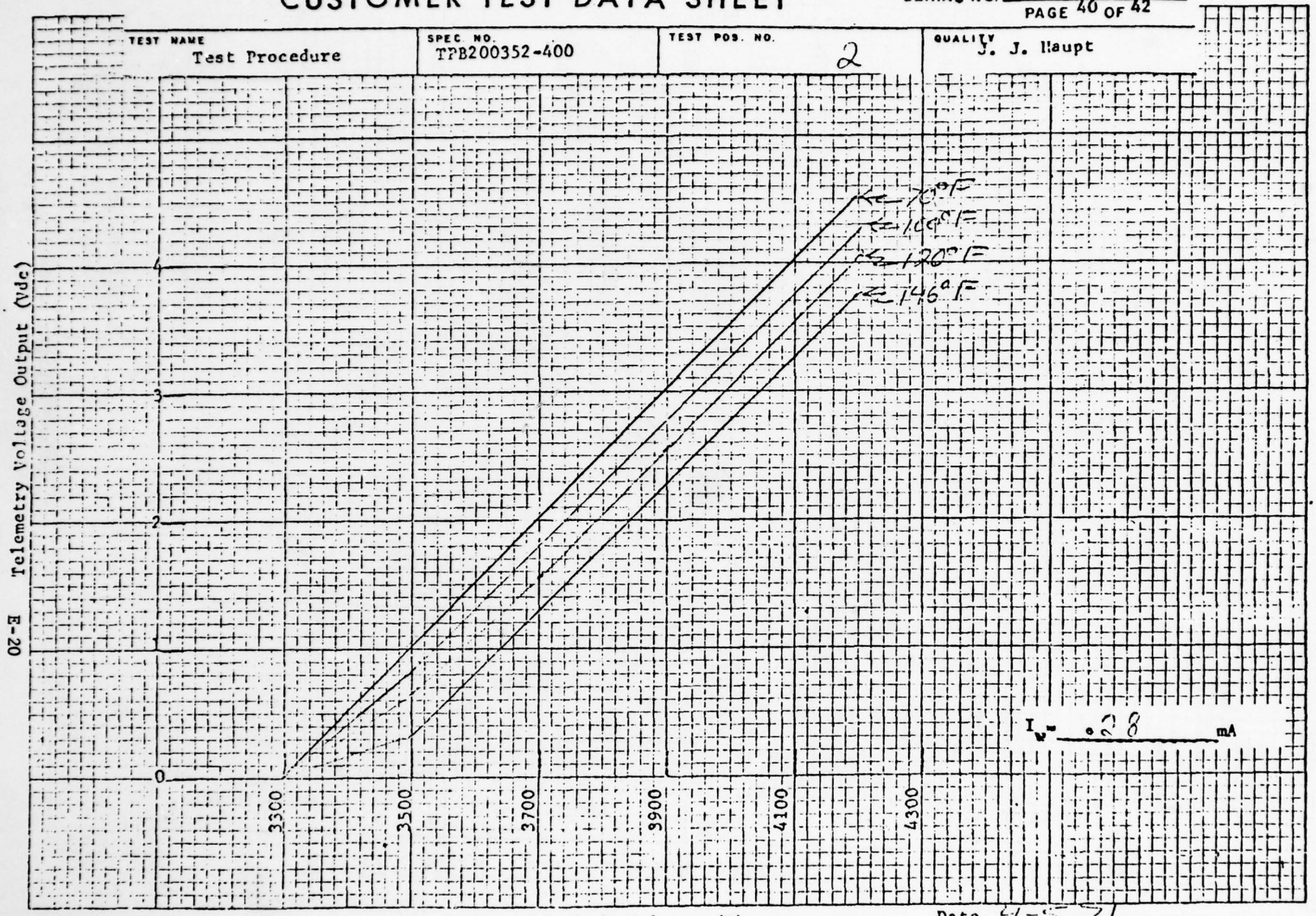
MODEL B200352-120 S/N 12-3

SERIAL NO. 030



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |




Date 4-5-71

HUGHES AIRCRAFT COMPANY ELECTRON DYNAMICS DIVISION

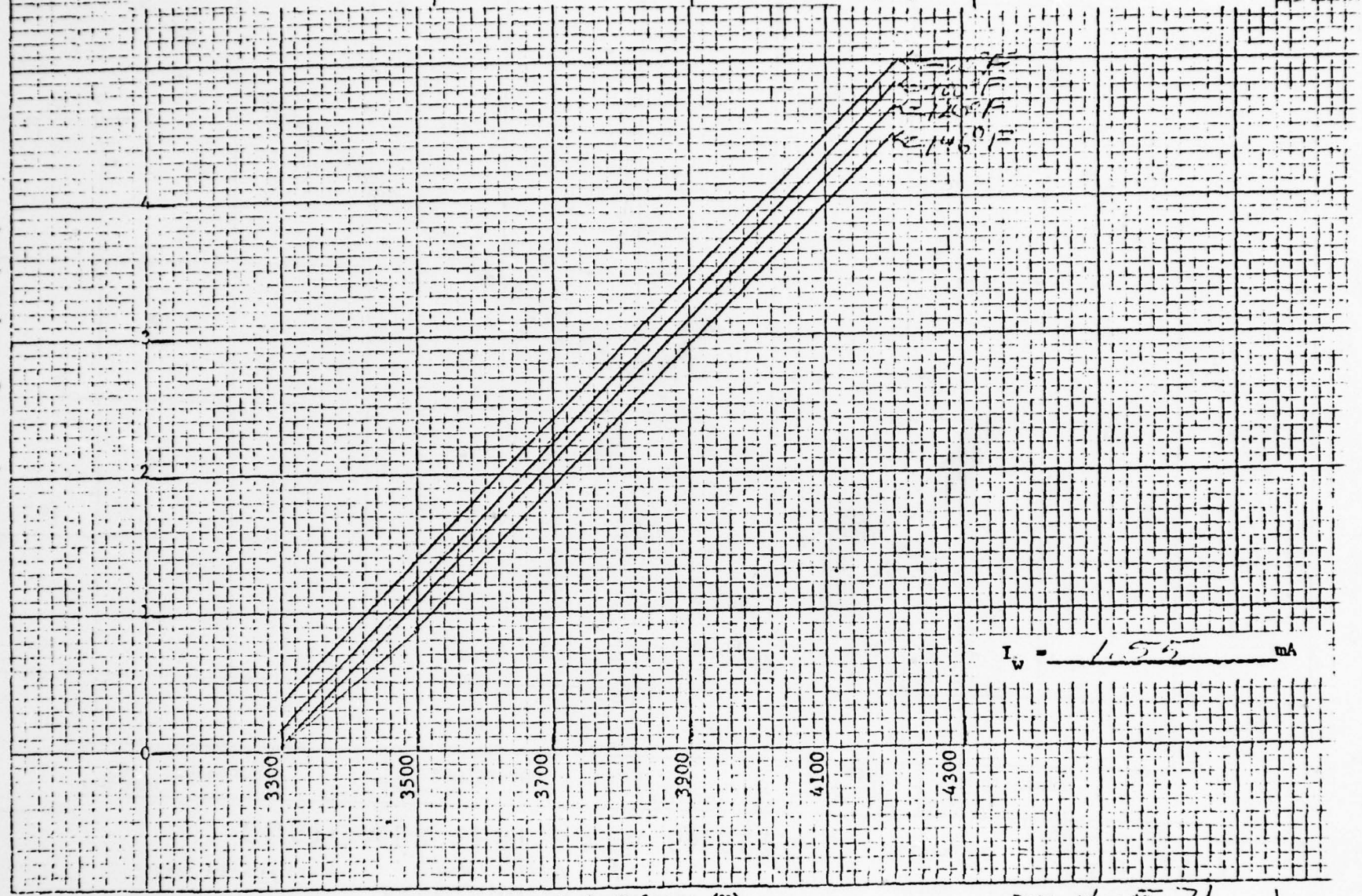
MODEL B200352-220 S/N 10

# CUSTOMER TEST DATA SHEET

SERIAL NO. 030 12-3



| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2. | J. J. Haupt |




$I_w$ = 1.55 mA

Date 4-5-71

HUGHES
HUGHES AIRCRAFT COMPANY

[redacted] Par [redacted].1.[redacted] Input [redacted] rem[redacted] Telemetry

ELECTRON DYNA[redacted]ICS DIVISION

TRW S/N 22-1

# CUSTOMER TEST DATA SHEET

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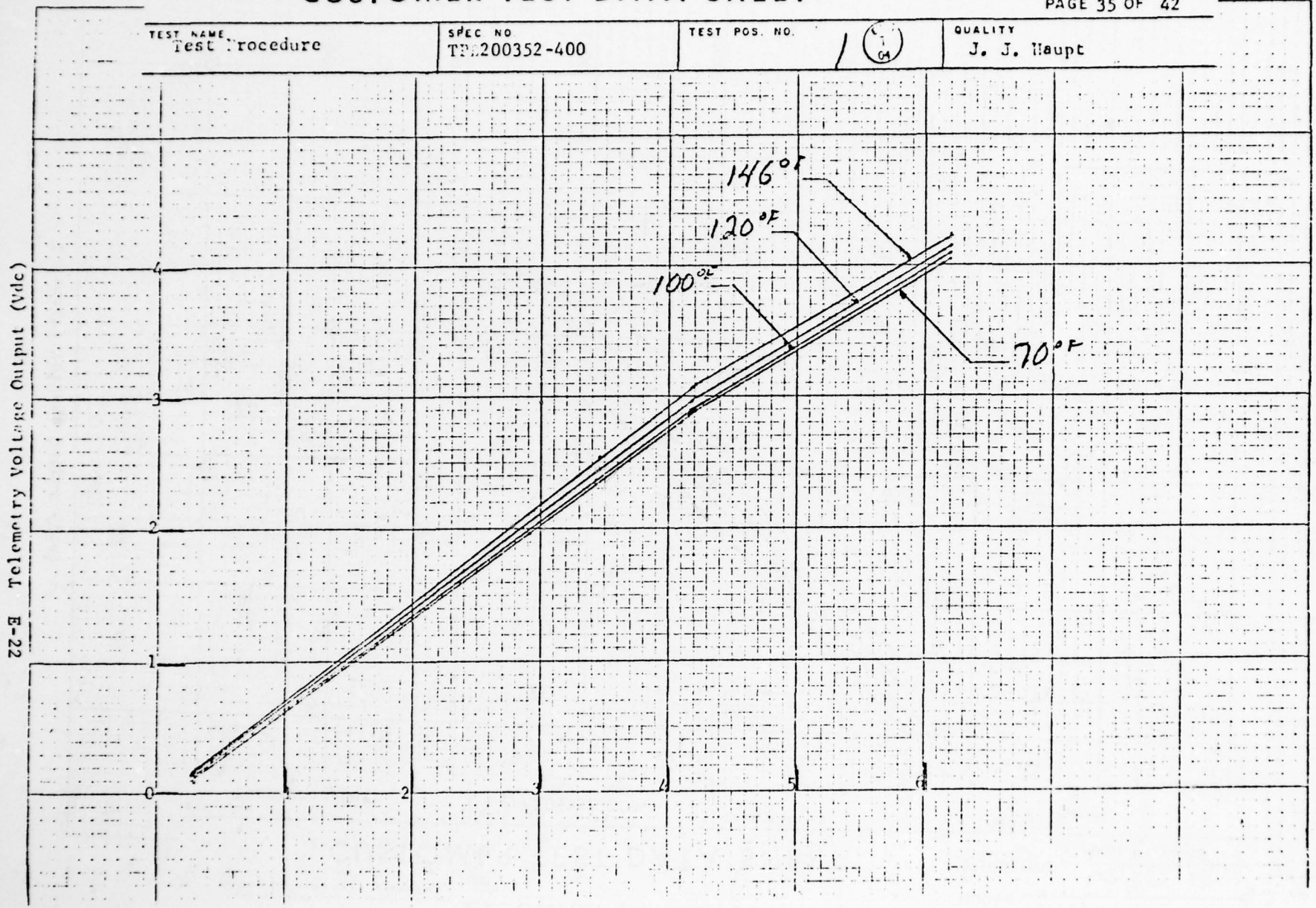
REV. K

MODEL P200352-120

SERIAL NO. 036 22-1



| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TP200352-400 | 1 (04) | J. J. Haupt |



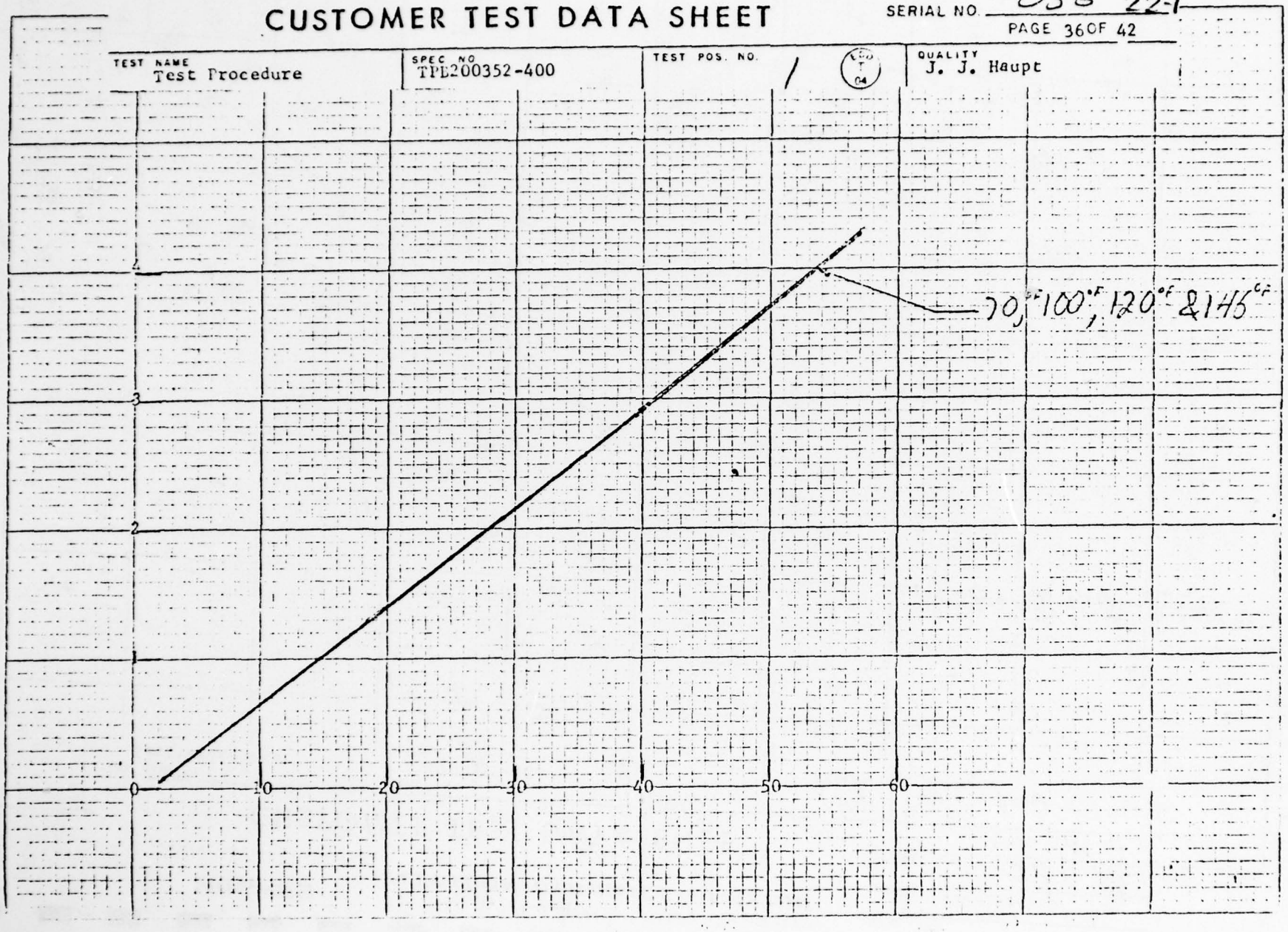
HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.2 Cathode Current Telemetry
**ELECTRON DYNAMICS DIVISION**

REV. K
MODEL P200352-120
SERIAL NO. 036 22-1


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPL200352-400 | 1 | J. J. Haupt |



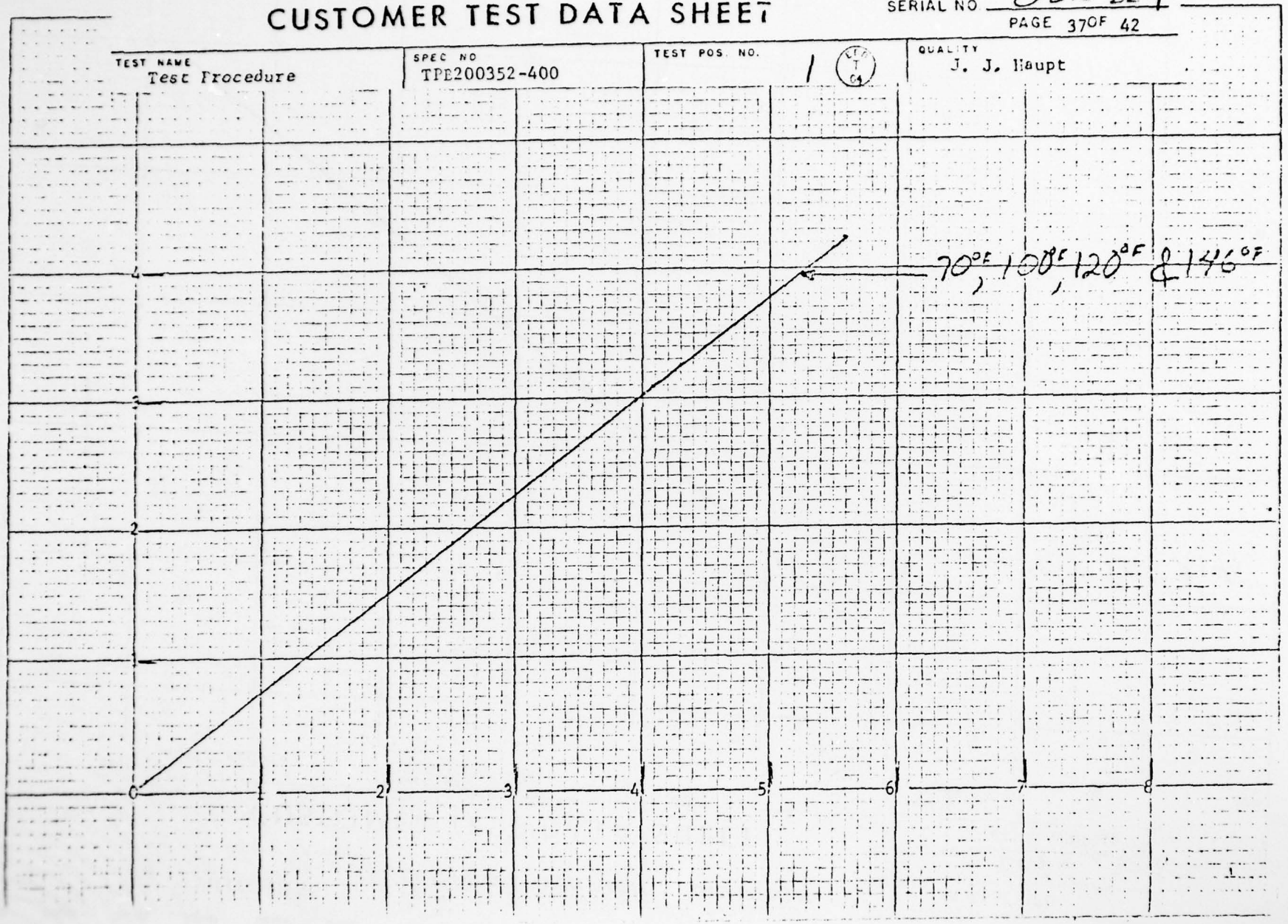
HUGHES
HUGHES AIRCRAFT COMPANY

For 5.3.1.3 Heate Voltage Telemetry
ELECTRON DYNAMICS DIVISION

REV. K
MODEL B200352-120
SERIAL NO 036 22-1
PAGE 37 OF 42

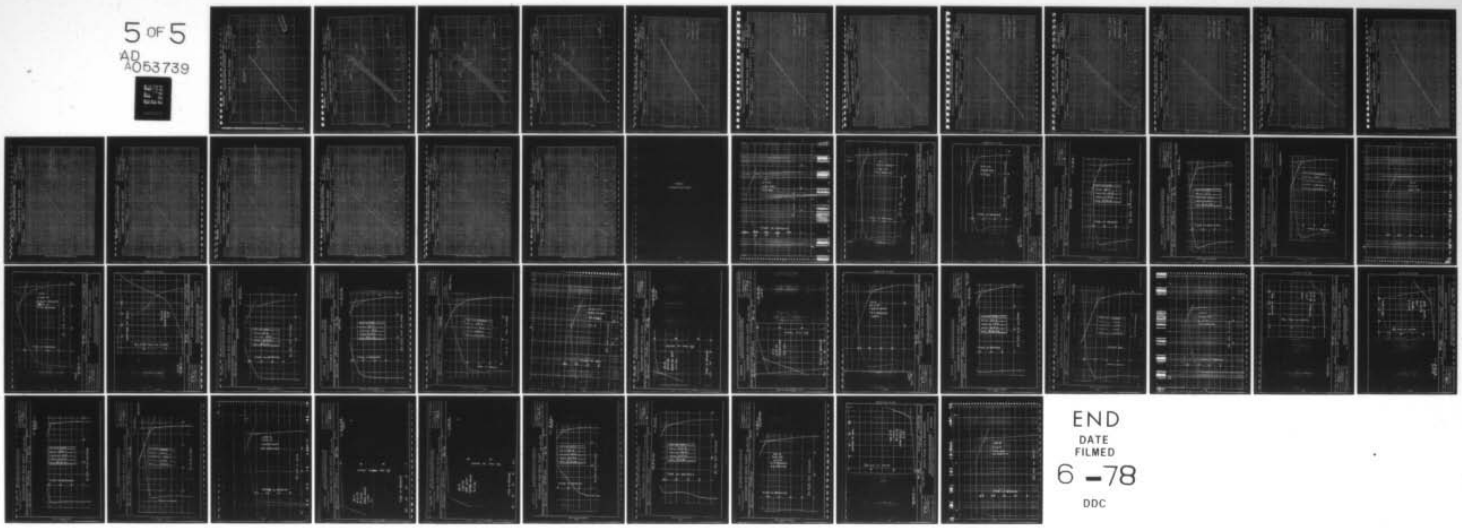
# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPE200352-400 | 1 | J. J. Haupt |



AD-A053 739 HUGHES AIRCRAFT CO TORRANCE CALIF ELECTRON DYNAMICS DIV F/G 9/1
DEFENSE SATELLITE COMMUNICATIONS SYSTEM TRAVELING WAVE TUBE AMP--ETC(U)
FEB 78 M L KAHN F04701-74-C-0542
UNCLASSIFIED NL

5 OF 5
AD
A053739



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DATE FILMED
6 -78
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HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.4 Helix Curre Telemetry and Overcurrent

ELECTRON DYNAMICS DIVISION

REV. K

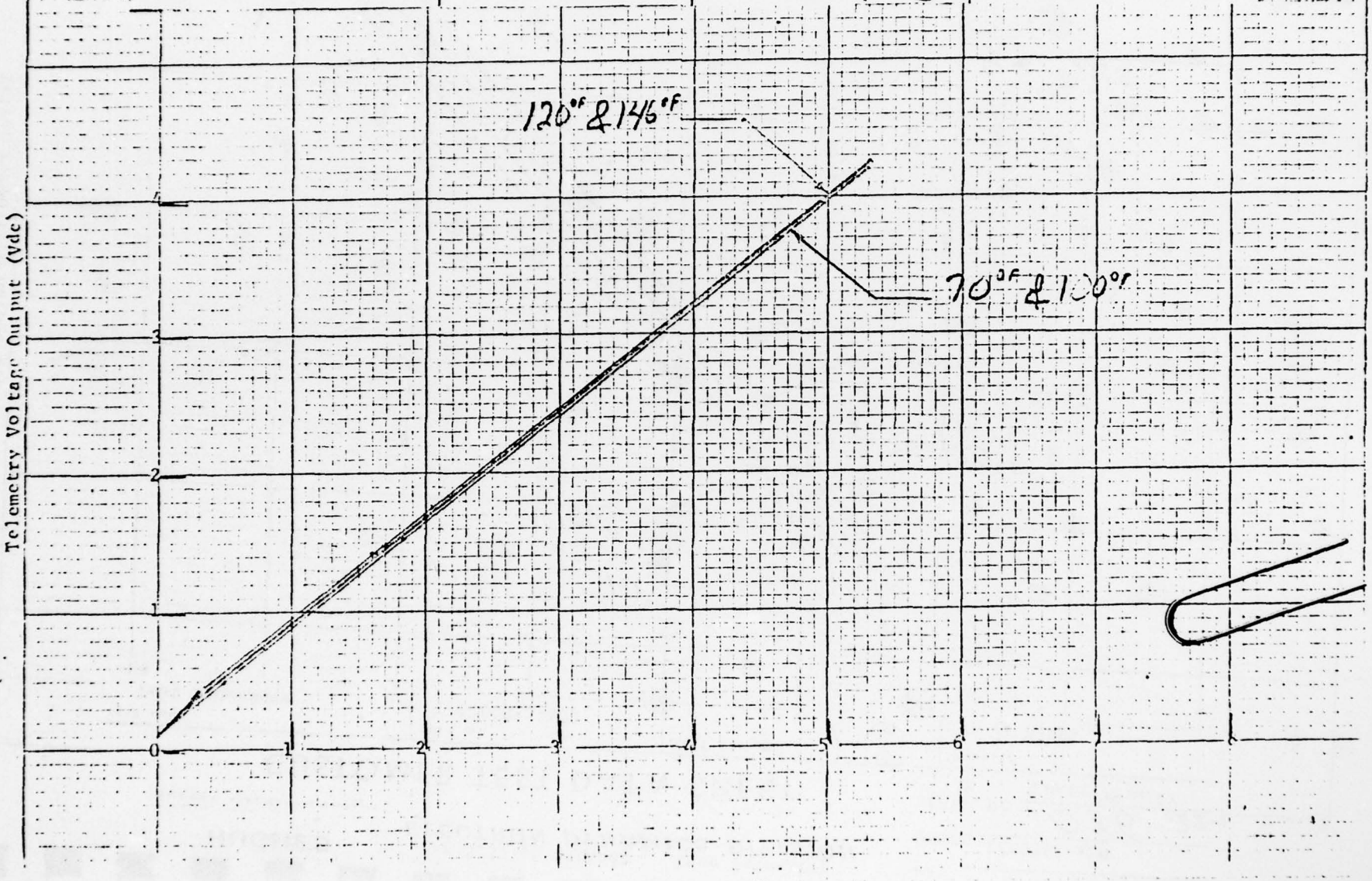
MODEL P200352-120

SERIAL NO. 036 22-1

PAGE 38 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPE200352-400 | 1 | J. J. Haupt |




E-25

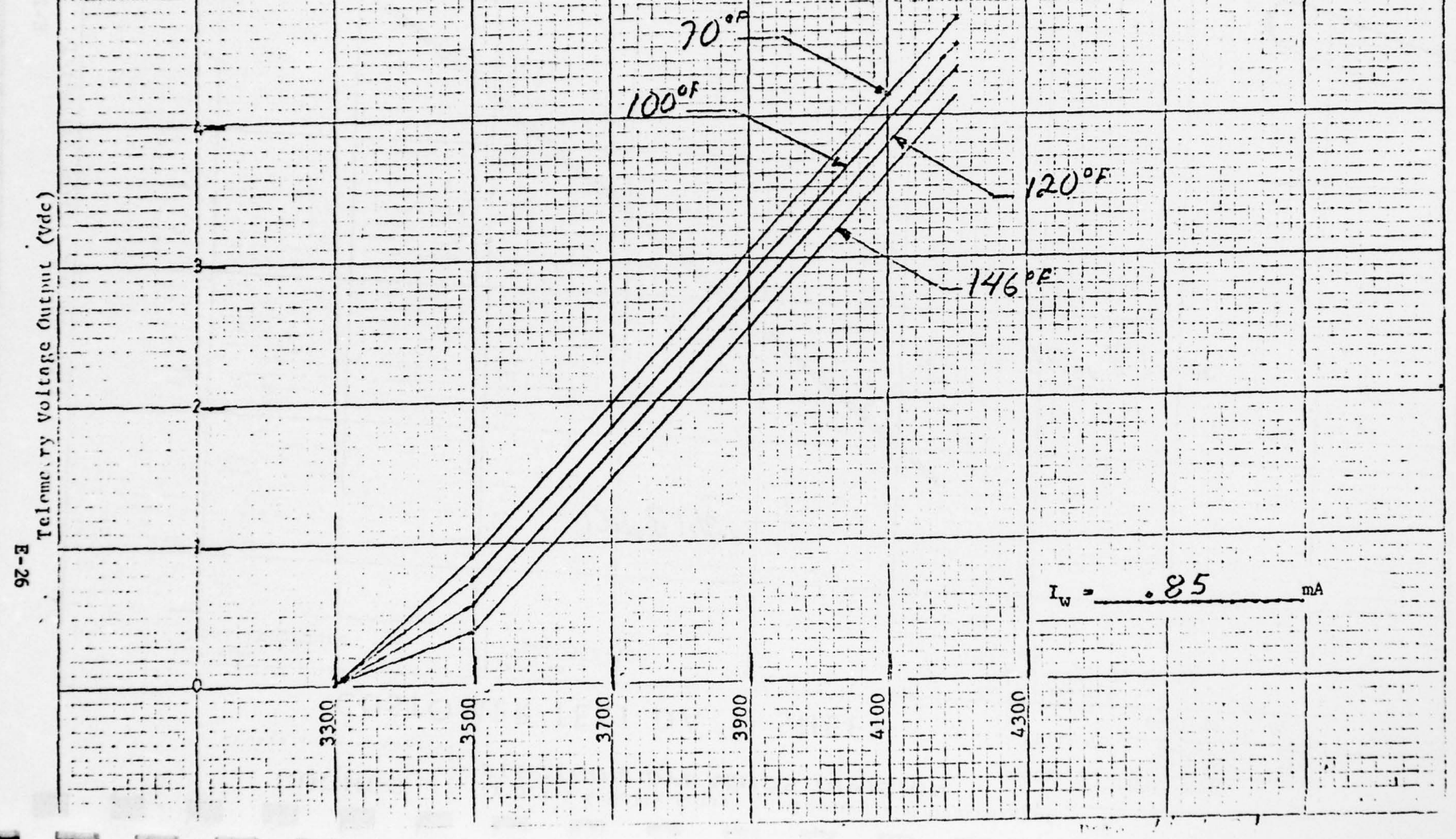
HUGHES
HUGHES AIRCRAFT COMPANY

For 5.3.1.5 Cathode \ tage Telemetry
ELECTRON DYNAMICS DIVISION

REV. K
MODEL E200352-120
SERIAL NO. 036 22-1


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO. | TEST POS NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 1 (LL, M) | J. J. Haupt |




$I_w$ = .85 mA

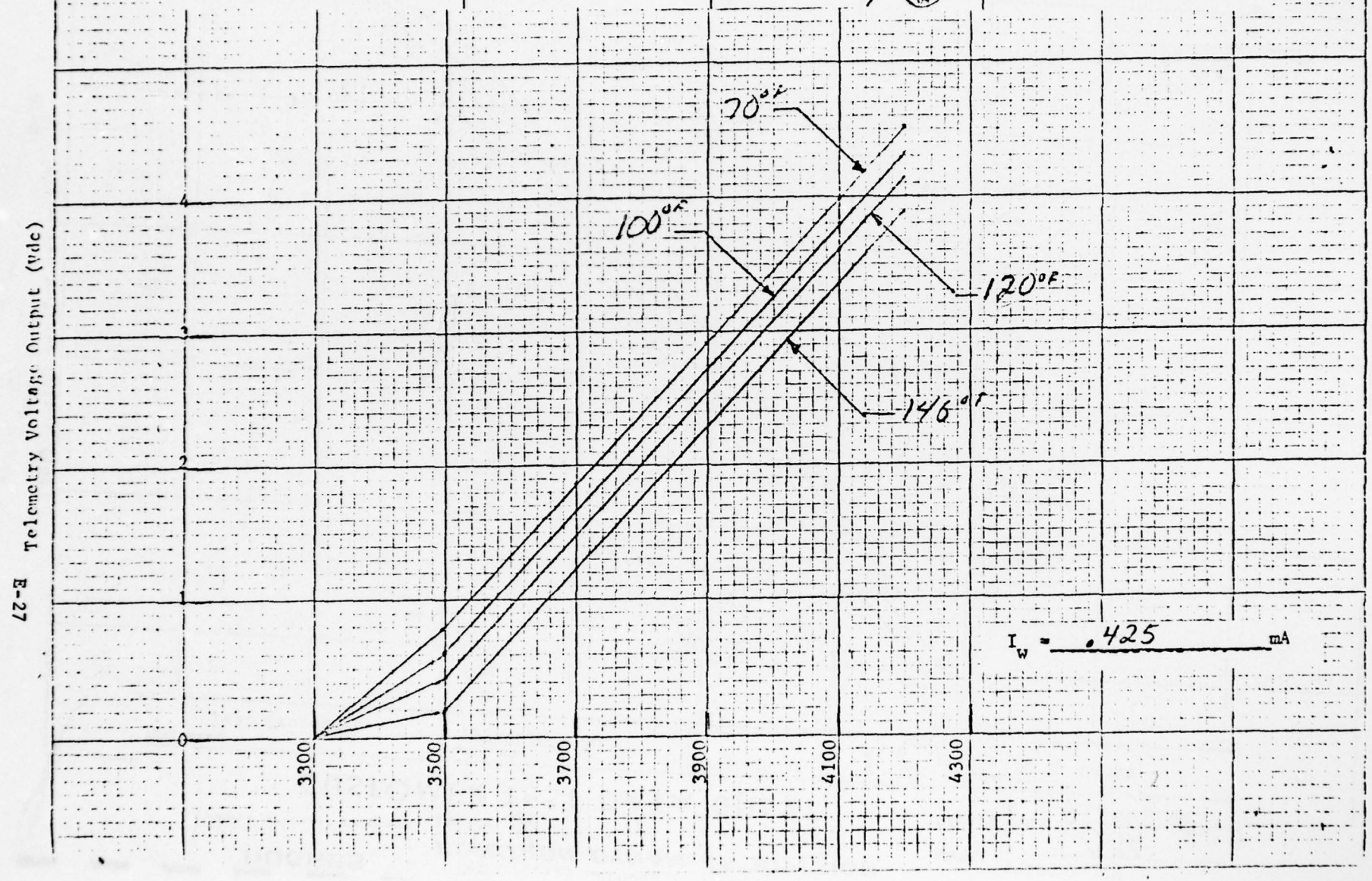
HUGHES
HUGHES AIRCRAFT COMPANY

For 5.3.1.5 Cathode Voltage Telemetry
**ELECTRON DYNAMICS DIVISION**

REV. K
MODEL B200352-120
SERIAL NO. 036 22-1


# CUSTOMER TEST DATA SHEET

TEST NAME: Test Procedure | SPEC NO: TPB200352-400 | TEST POS. NO. 1 (T-04) | QUALITY: J. J. Haupt




$I_W$ = .425 mA

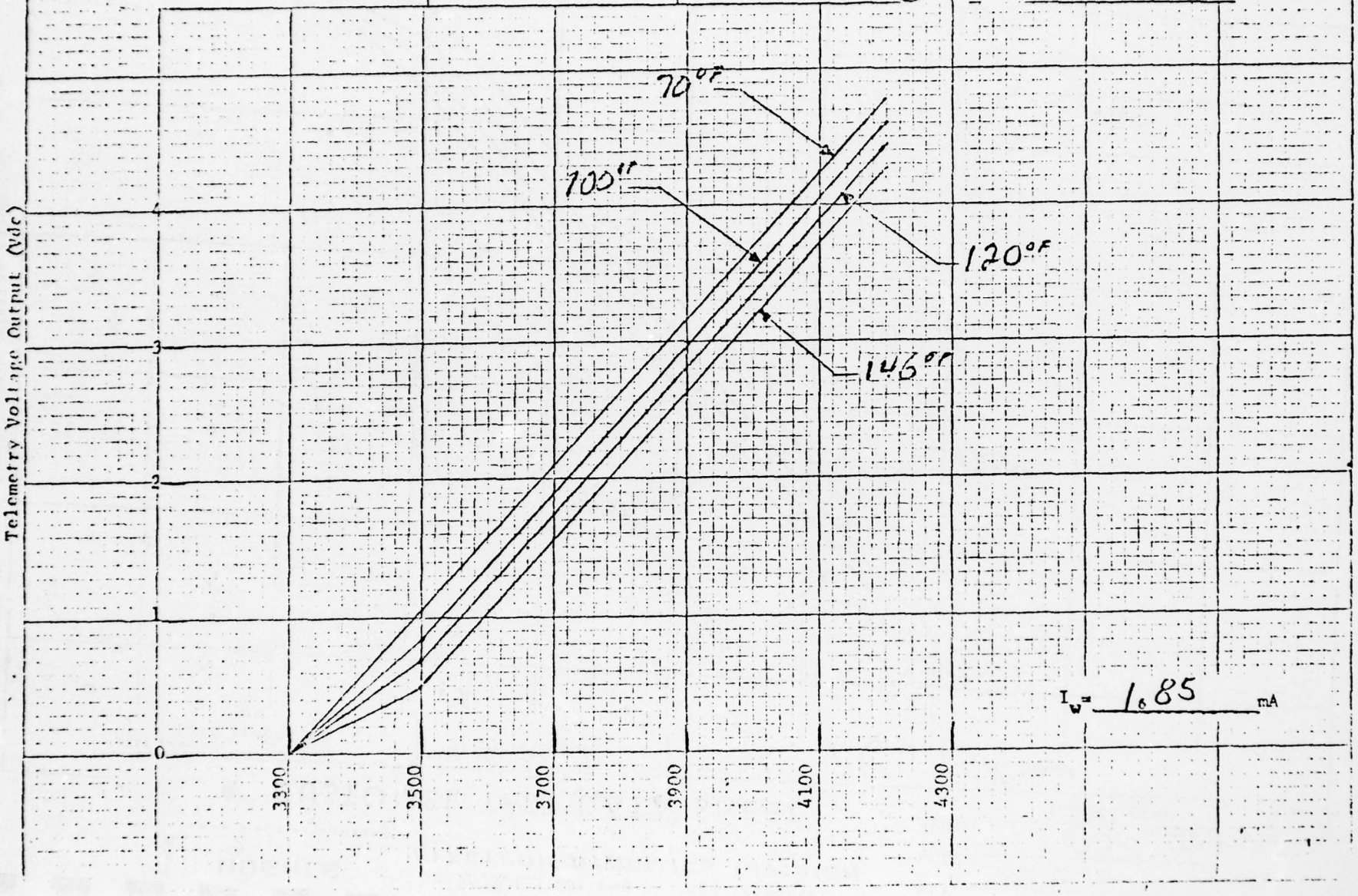
HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.5 Cathode ... age Telemetry
ELECTRON DYNAMICS DIVISION
New SN 22-1

REV
MODEL B200352-120
SERIAL NO. 036 22-1
PAGE 40 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 1 (Cold T/M) | J. J. Haupt |



HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

REV. K

MODEL B200352-120

SERIAL NO. 032 22-2

# CUSTOMER TEST DATA SHEET



| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TP200352-400 | 2 (T) | J. J. Haupt |



HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.2 Cathode Current Telemetry
ELECTRON DYNAMICS DIVISION

DA[redacted]HE[redacted] DS[redacted]352[redacted]0 1

REV. K

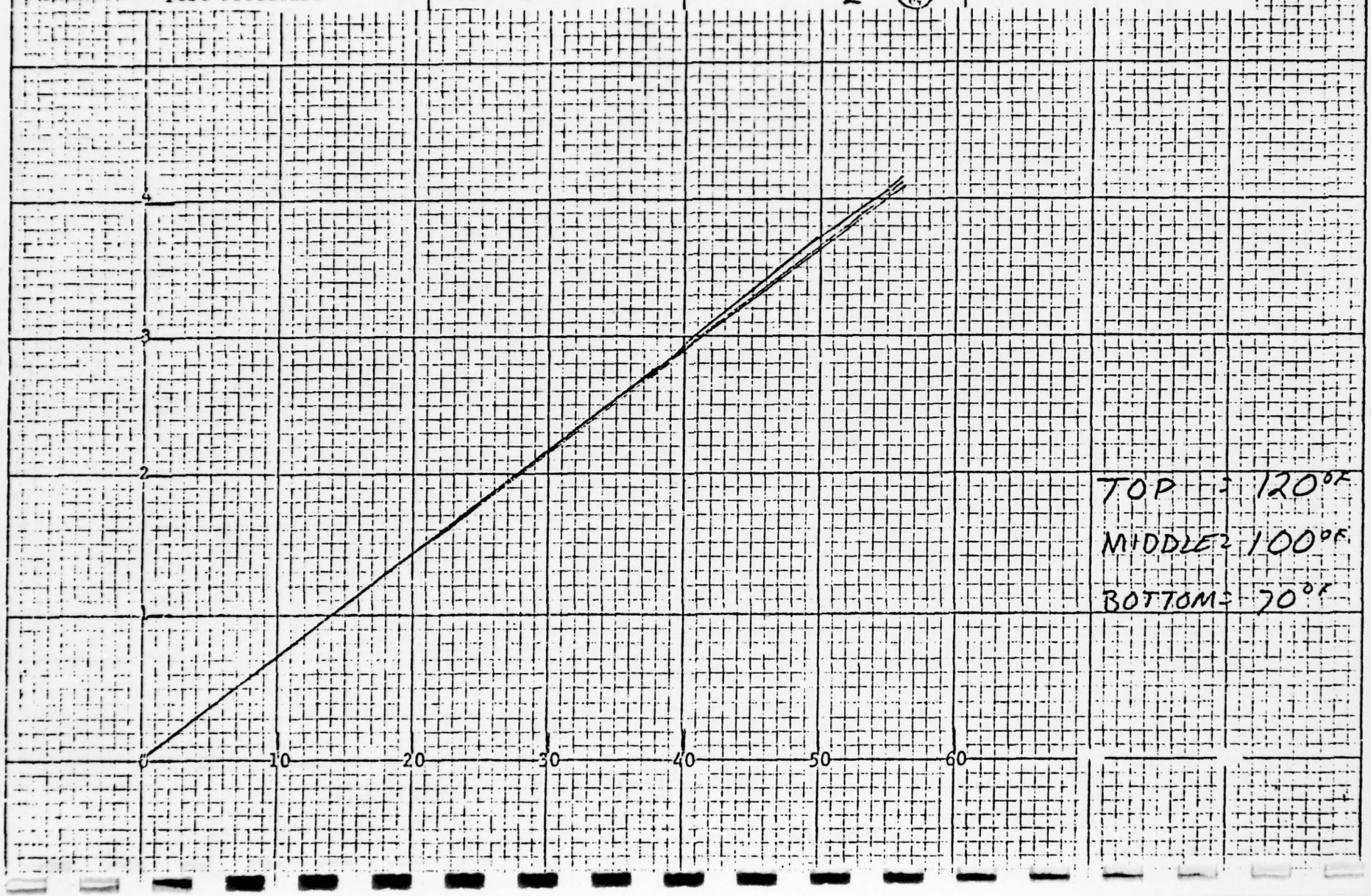
MODEL B200352-120

SERIAL NO. 032 22-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |



HUGHES
HUGHES AIRCRAFT COMPANY

Par [illegible] Heat [illegible] Telemetry)

ELECTRON DYNAMICS DIVISION

R[illegible] K

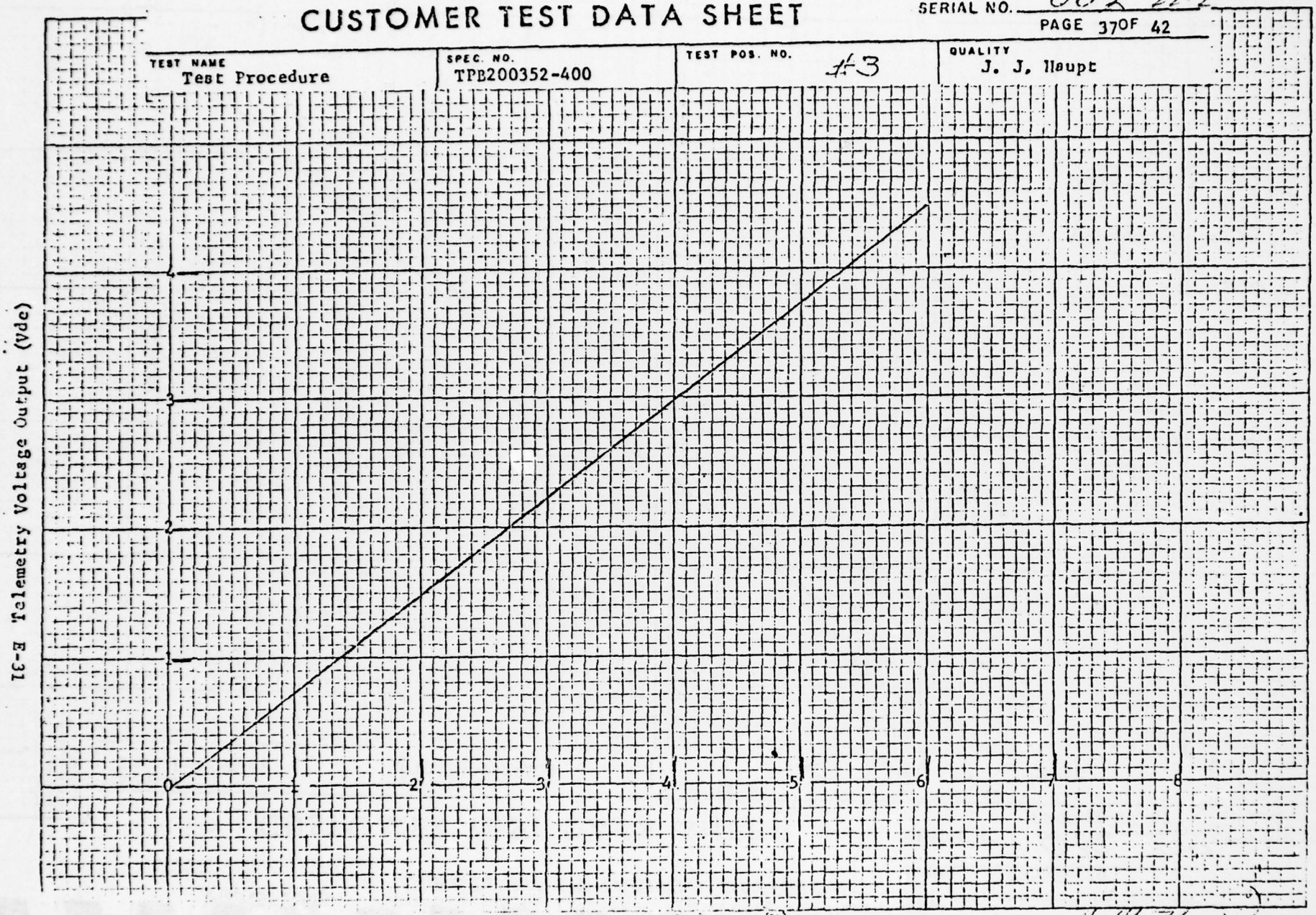
MODEL B200352-120

SERIAL NO. 032 22-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #3 | J. J. Haupt |




Date 4-19-71

HUGHES
HUGHES AIRCRAFT COMPANY

DATA SHEET [illegible] 52-[illegible]

Par 3.3.1.4 Helix Curre[illegible] Telemetry and Overcurrent

ELECTRON DYNAMICS DIVISION

REV. K

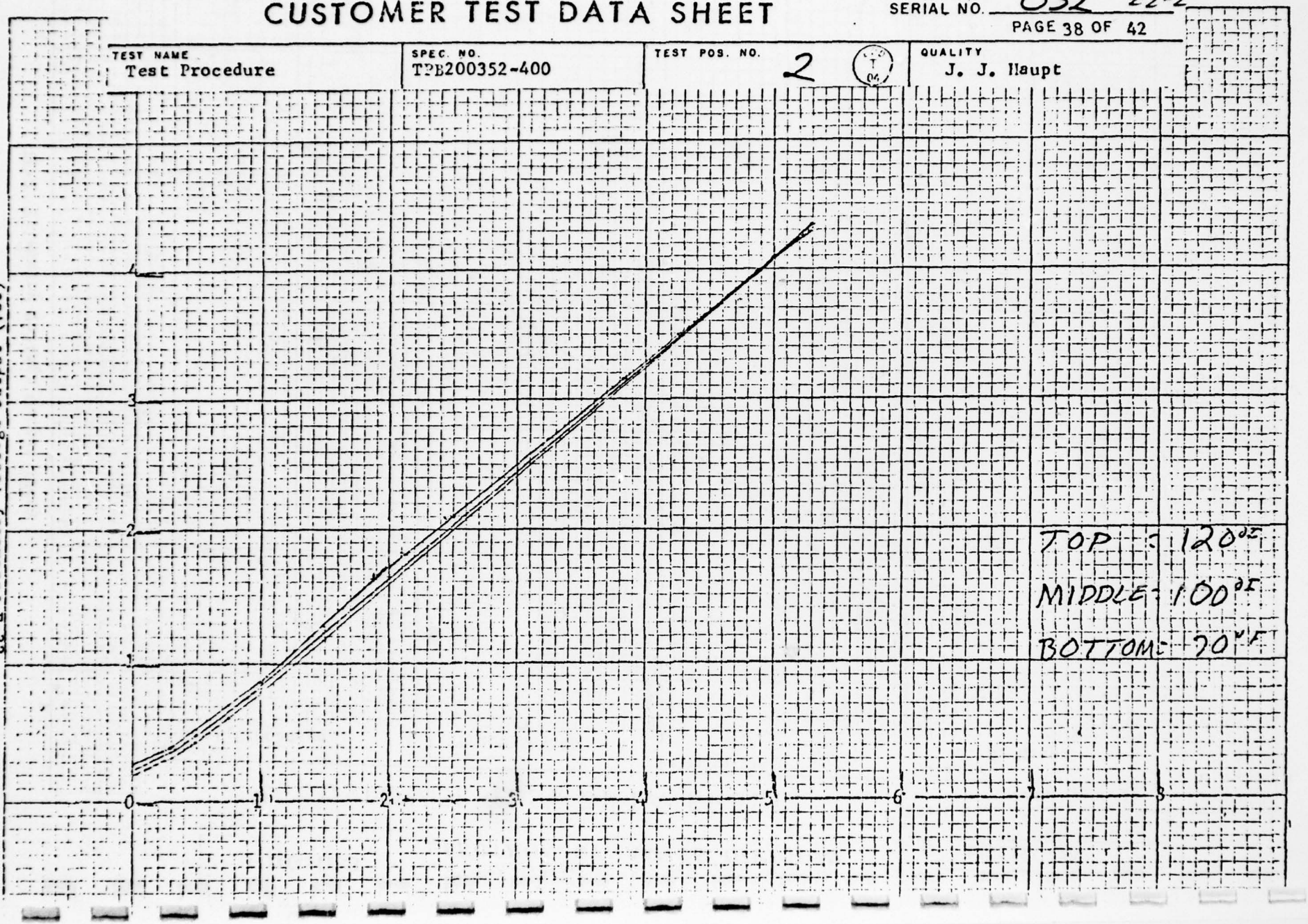
MODEL P200352-120

SERIAL NO. 032 22-2

PAGE 38 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |



HUGHES AIRCRAFT COMPANY

Tar 5.5.1.5 Cathode ltage Telemetry
ELECTRON DYNAMICS DIVISION

REV. K

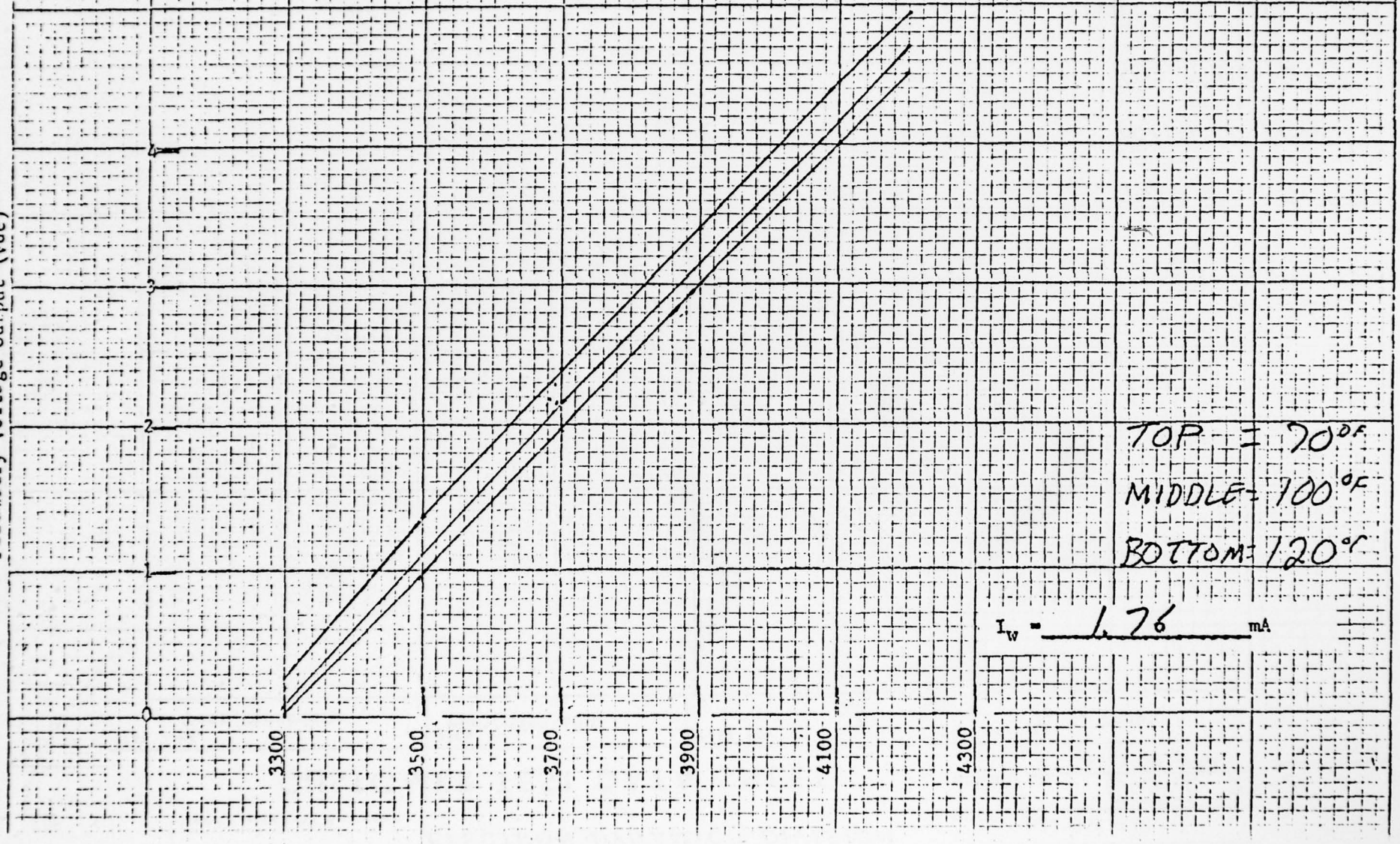
MODEL B200352-120

SERIAL NO. 032 22-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 (T 01) | J. J. Haupt |




TOP = 70°F

MIDDLE = 100°F

BOTTOM = 120°F

$I_W$ = 1.76 mA

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

REV.

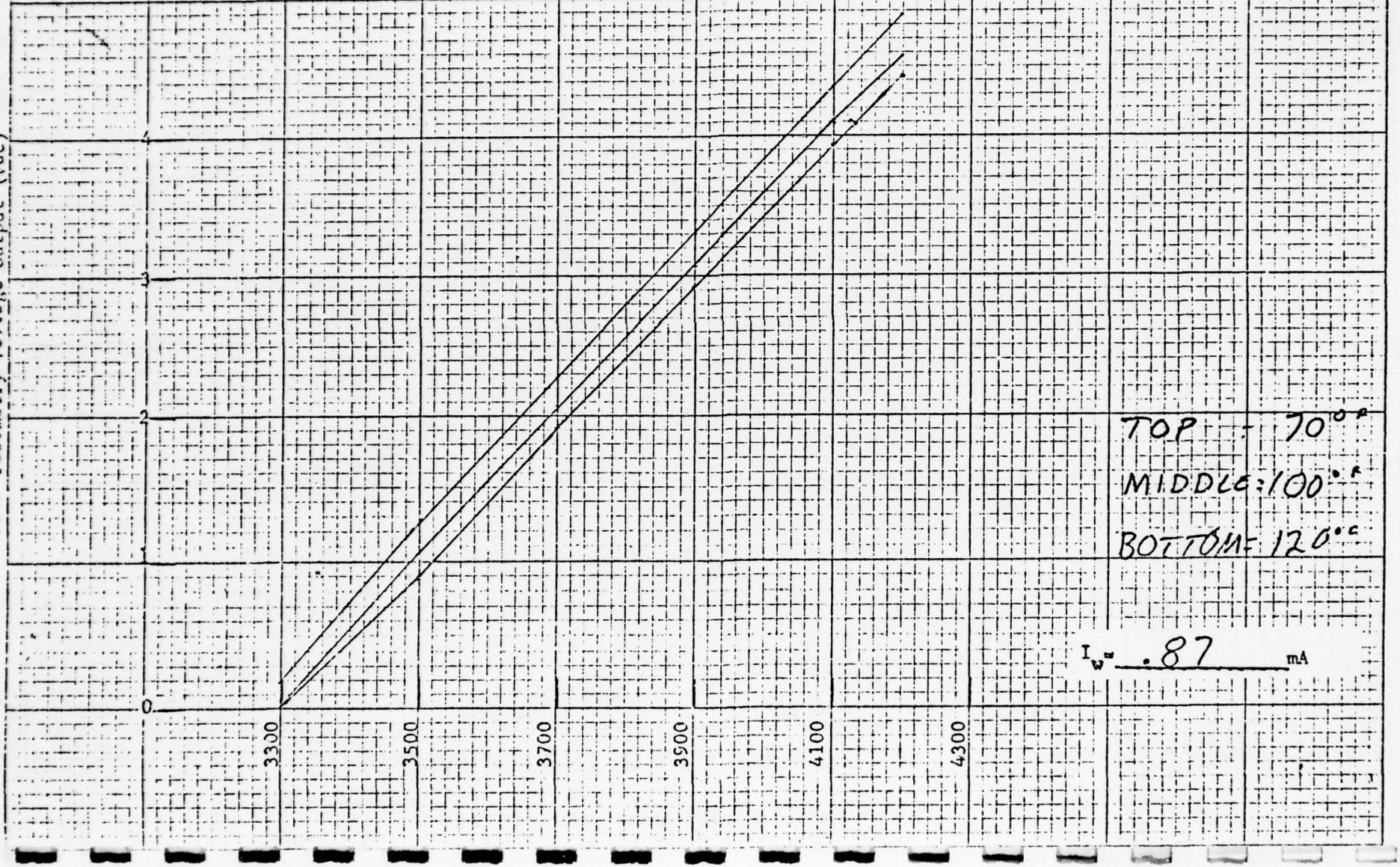
MODEL B200352-120

SERIAL NO. 032 22-2



# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | 2 | J. J. Haupt |




TOP = 70°F

MIDDLE = 100°F

BOTTOM = 120°C

$I_w$ = .87 mA

HUGHES
HUGHES AIRCRAFT COMPANY

Int 5.5.1.5 Cathode Cage Telemetry

ELECTRON DYNAMICS DIVISION

REV. K

MODEL B200352-120

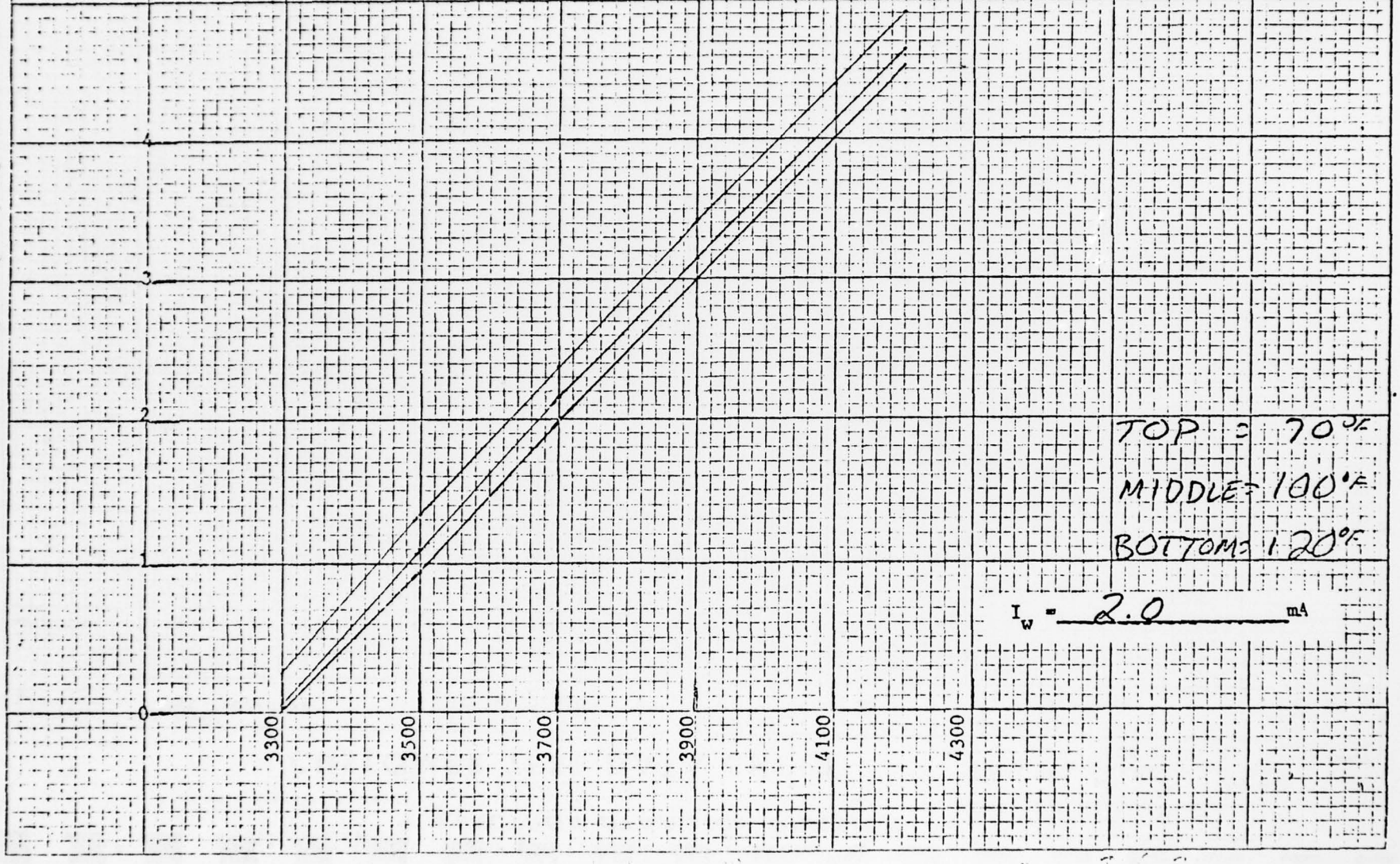
SERIAL NO. 032 22-2



Mu Sn 22-2

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TP B200352-400 | 2 | J. J. Haupt |




TOP = 70°F

MIDDLE = 100°F

BOTTOM = 120°F

$I_w$ = 2.0 mA

HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

REV. K

MODEL B200352-120

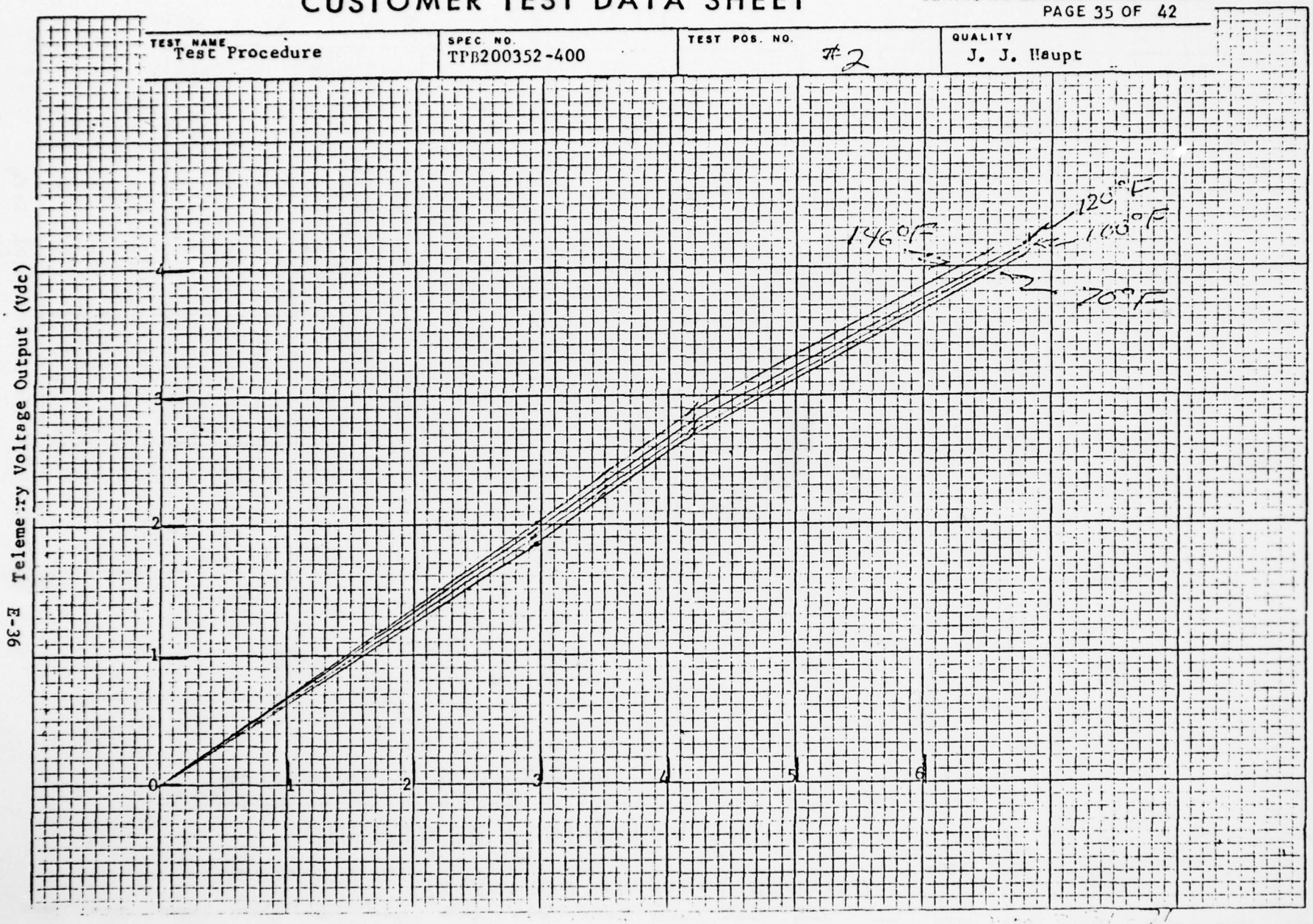
SERIAL NO. 033 22-3

PAGE 35 OF 42

TRW S/N 22-3

# CUSTOMER TEST DATA SHEET

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|---|---|---|---|
| Test Procedure | TPB200352-400 | #2 | J. J. Haupt |



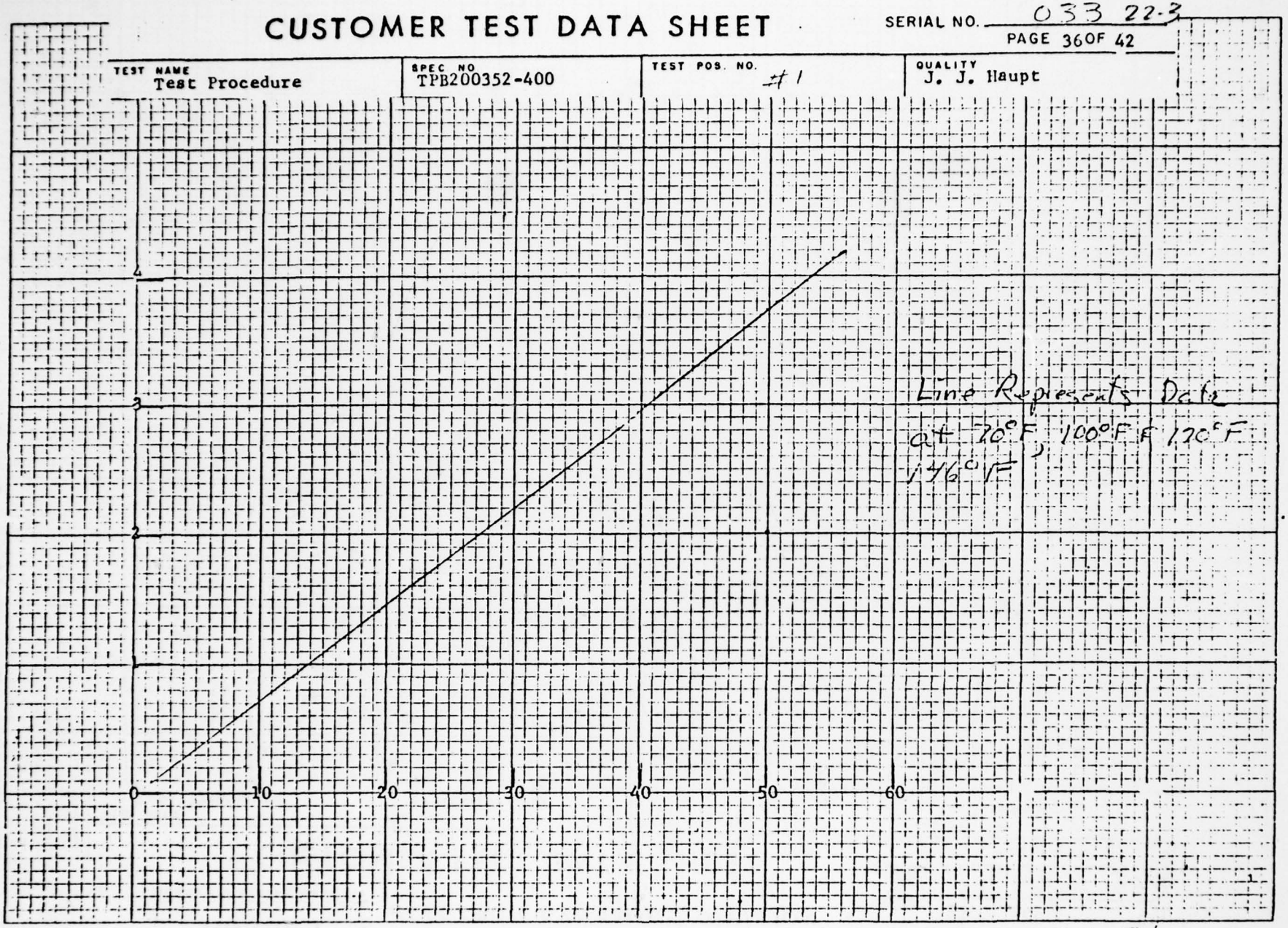
HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.2 Cathode Current Telemetry
ELECTRON DYNAMICS DIVISION

REV. K
MODEL B200352-120
SERIAL NO. 033 22-3


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #1 | J. J. Haupt |




Cathode Current (mA)

Date 2-5-71

HUGHES
HUGHES AIRCRAFT COMPANY

Par 5.3.1.3 Heater Voltage Telemetry

ELECTRON DYNAMICS DIVISION

REV. K

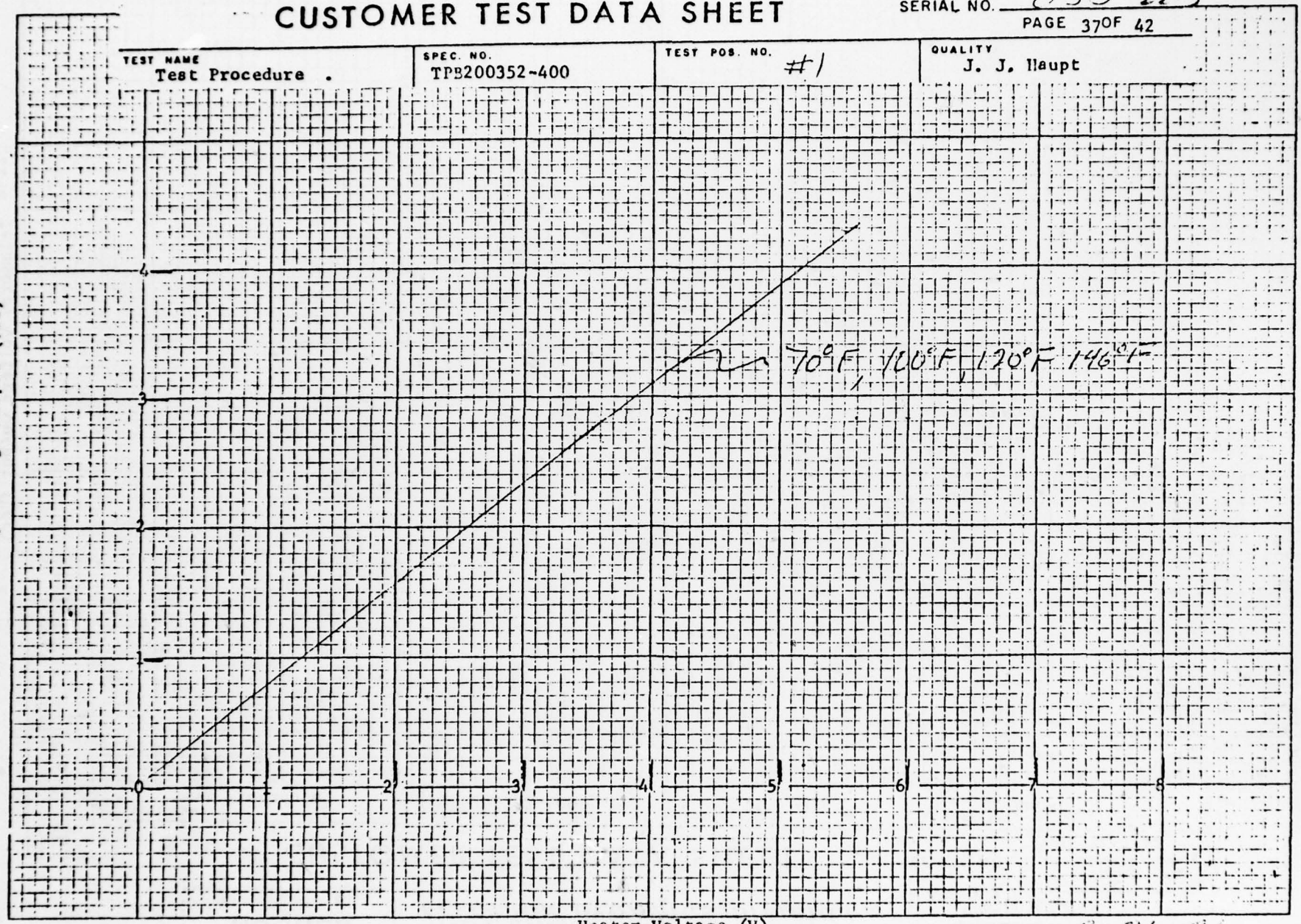
MODEL B200352-120

SERIAL NO. 033 22-3

PAGE 37 OF 42

# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure . | TPB200352-400 | #1 | J. J. Haupt |




Date 2-24-71

HUGHES
HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS DIVISION

Par 5.3.1.4 Helix Current Telemetry and Overcurrent

REV. K

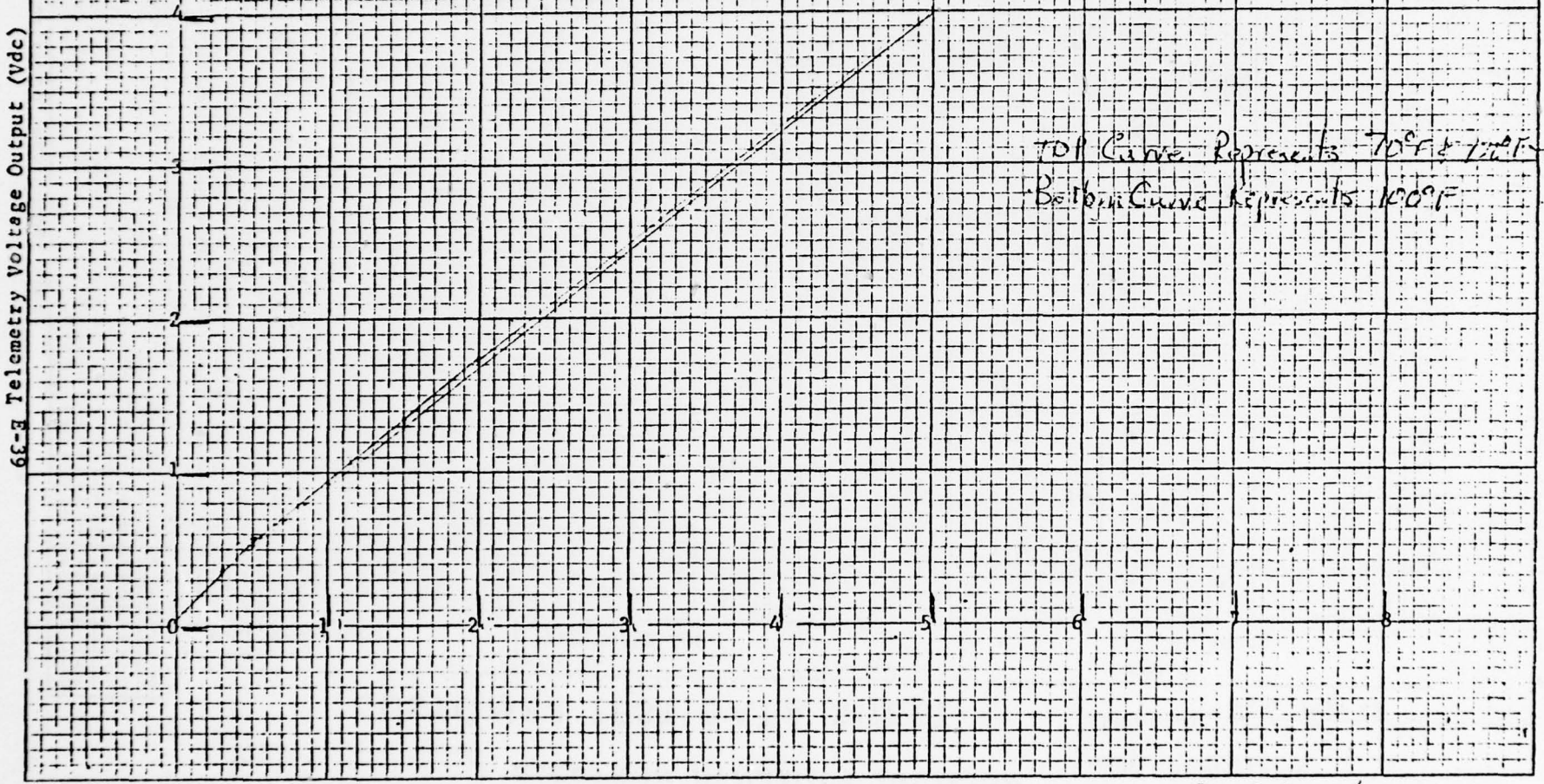
MODEL B200352-120

SERIAL NO. 033 22-3



# CUSTOMER TEST DATA SHEET

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Date 2-26-71

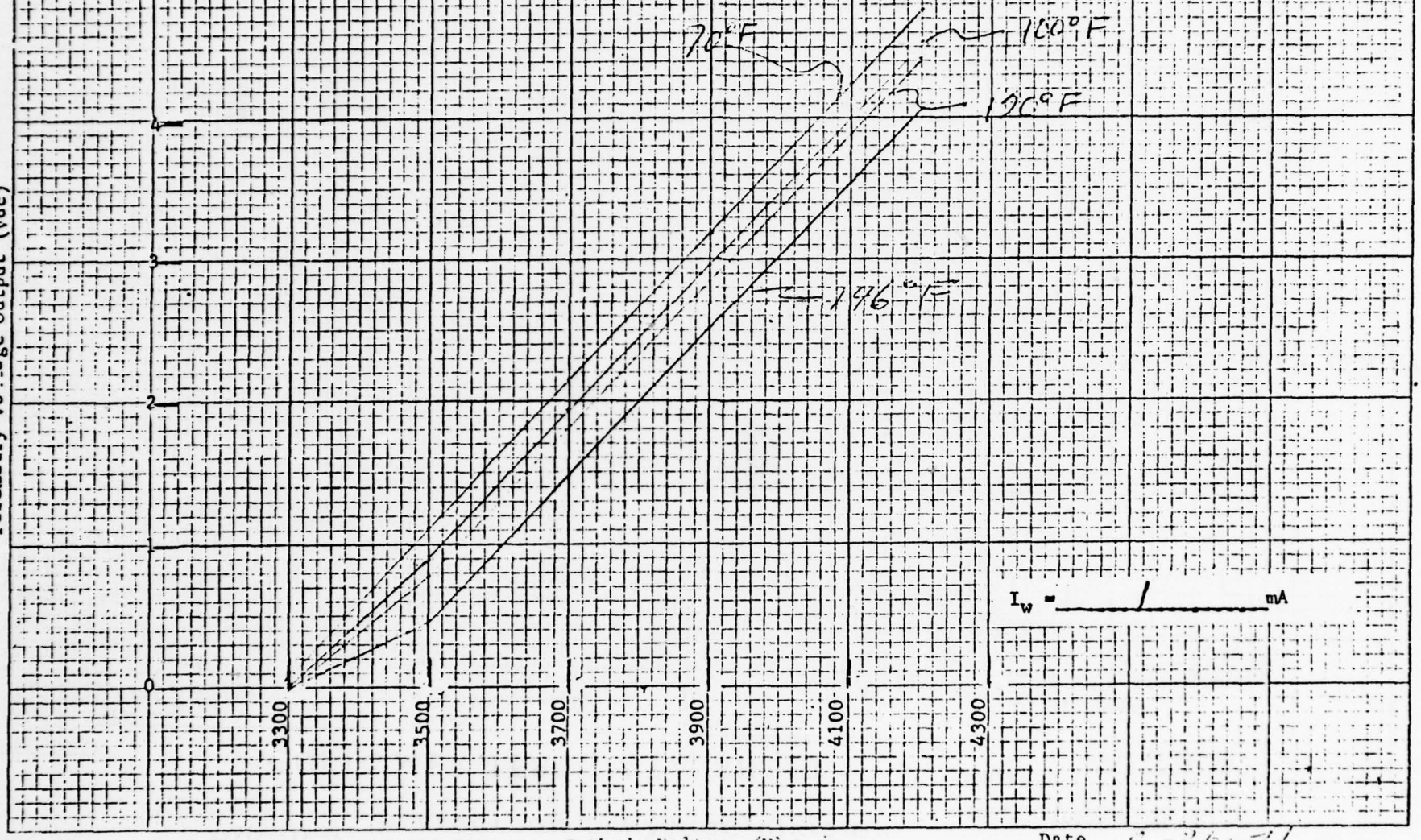
HUGHES
HUGHES AIRCRAFT COMPANY

Far 5.3.1.5 Cathode Stage Telemetry
ELECTRON DYNAMICS DIVISION

REV. K
MODEL B200352-120
SERIAL NO. 033 223


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC. NO. | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #1 | J. J. Haupt |




$I_w$ = 1 mA

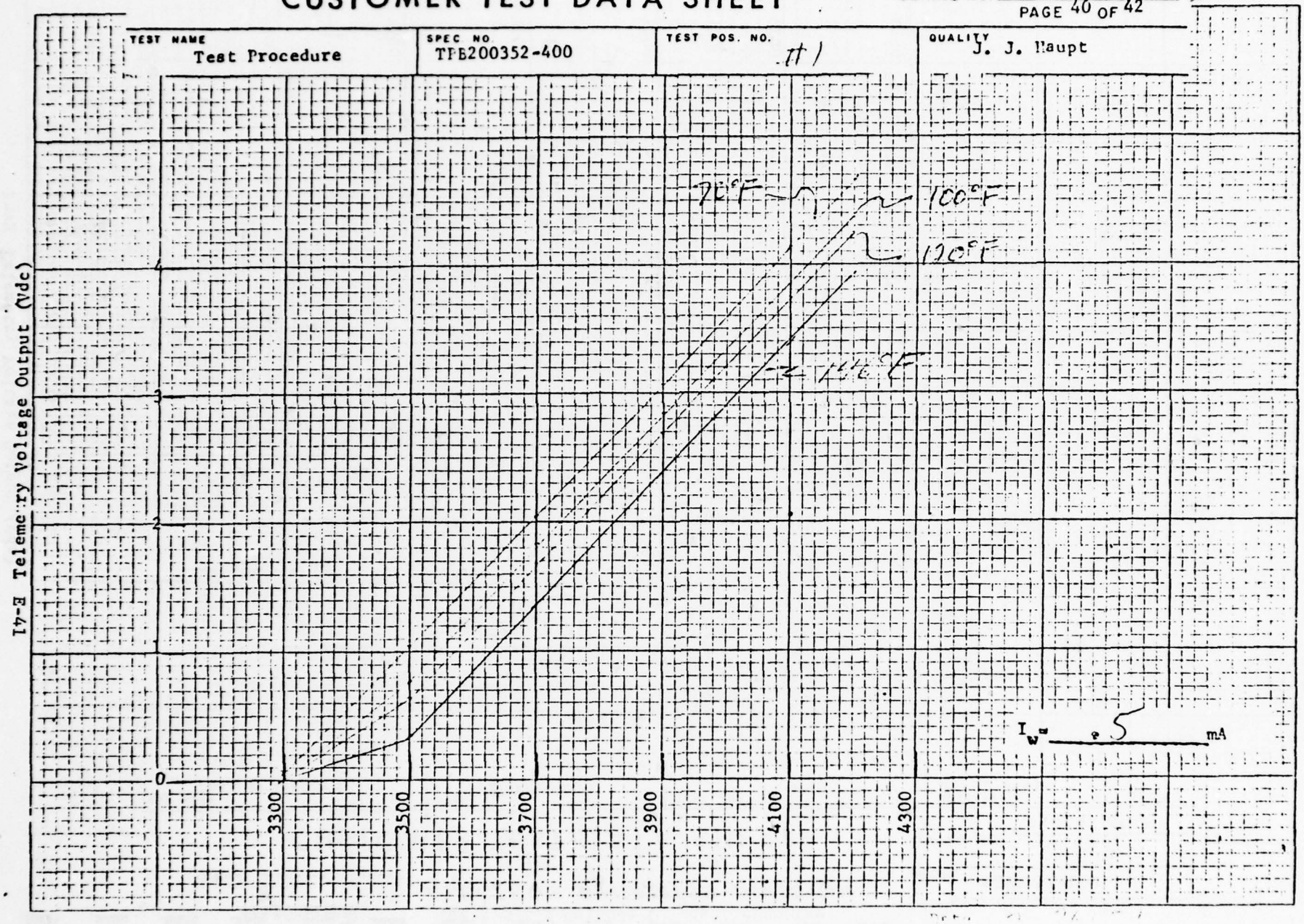
Date 6-26-71

HUGHES
HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS DIVISION

REV. K
MODEL B200352-120
SERIAL NO 033 22-3


# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS. NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #1 | J. J. Haupt |



HUGHES
HUGHES AIRCRAFT COMPANY

for 5.3.1.5 Cathode Voltage Telemetry

**ELECTRON DYNAMICS DIVISION**

Thru Sh 22-3

REV. K 22-3

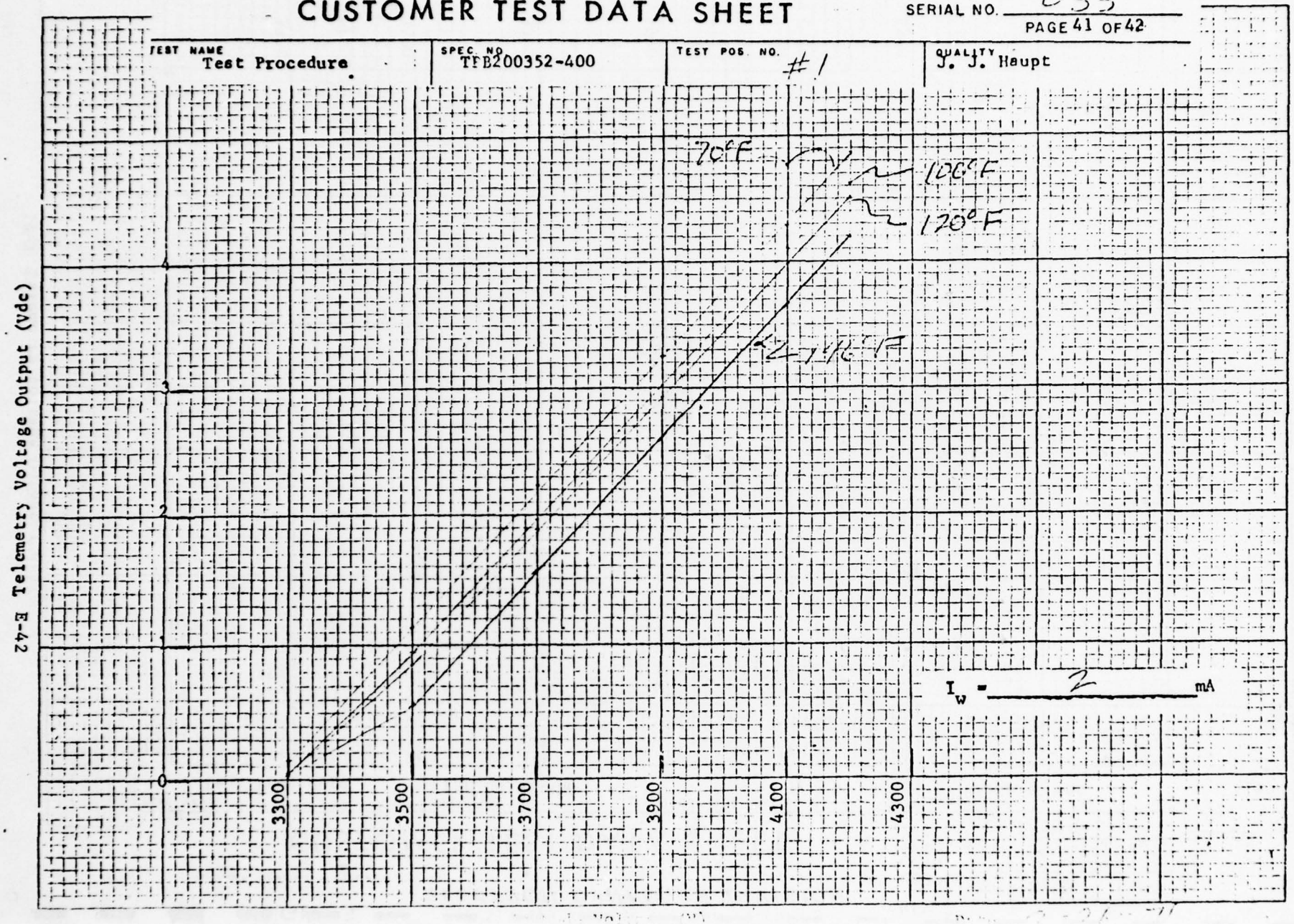
MODEL B200352-120

SERIAL NO. 033



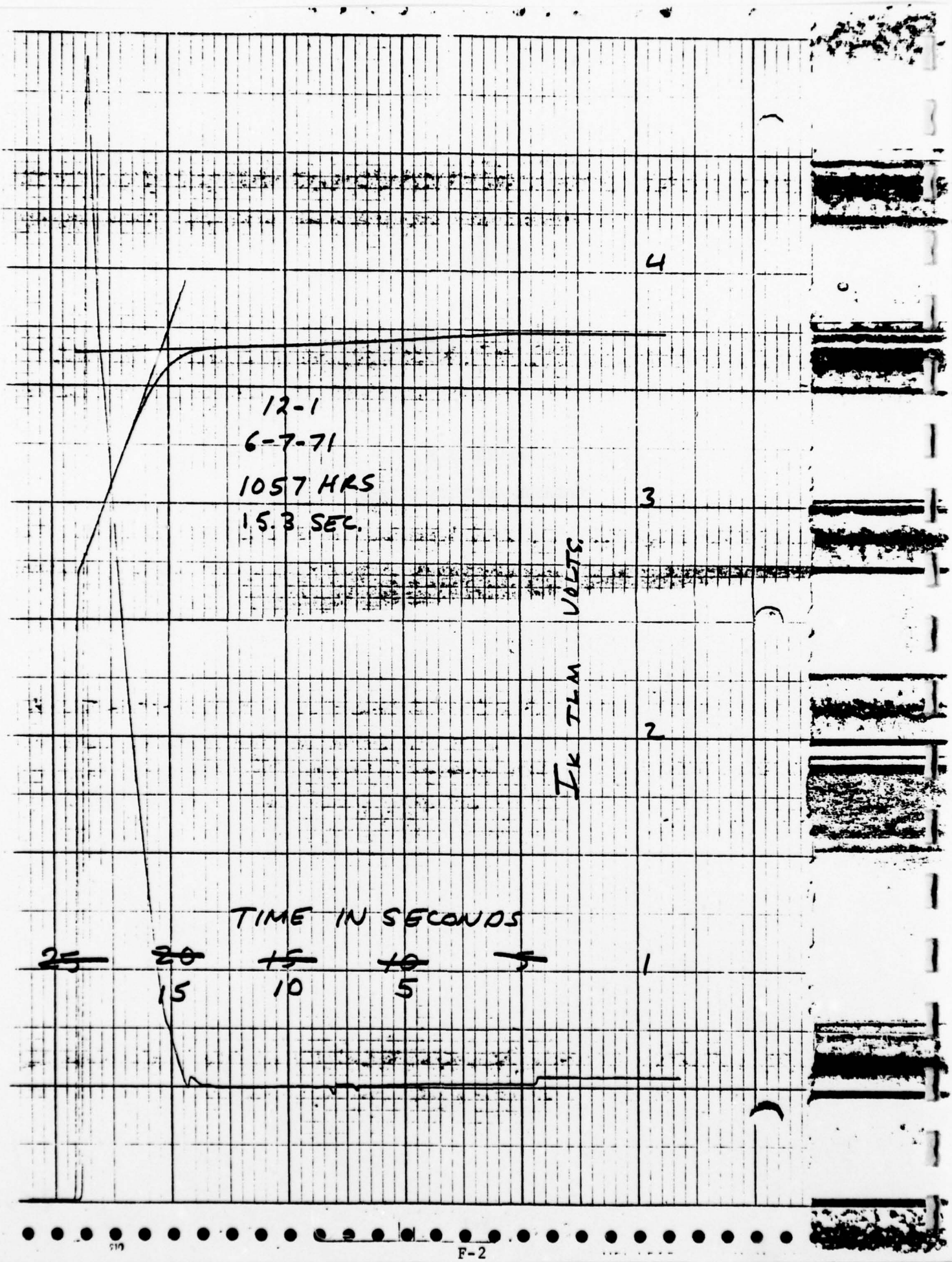
# CUSTOMER TEST DATA SHEET

| TEST NAME | SPEC NO | TEST POS NO. | QUALITY |
|---|---|---|---|
| Test Procedure | TPB200352-400 | #1 | J. J. Haupt |



# APPENDIX F

## CATHODE ACTIVITY CURVES


12-1
6-7-71
1057 HRS
15.3 SEC.
4
3
2
1
VOLTS.
IK TLM
TIME IN SECONDS
25
20
15
15
10
10
5
5

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 13,200 Hour Test

ELECTRON DYNAMICS DIVISION

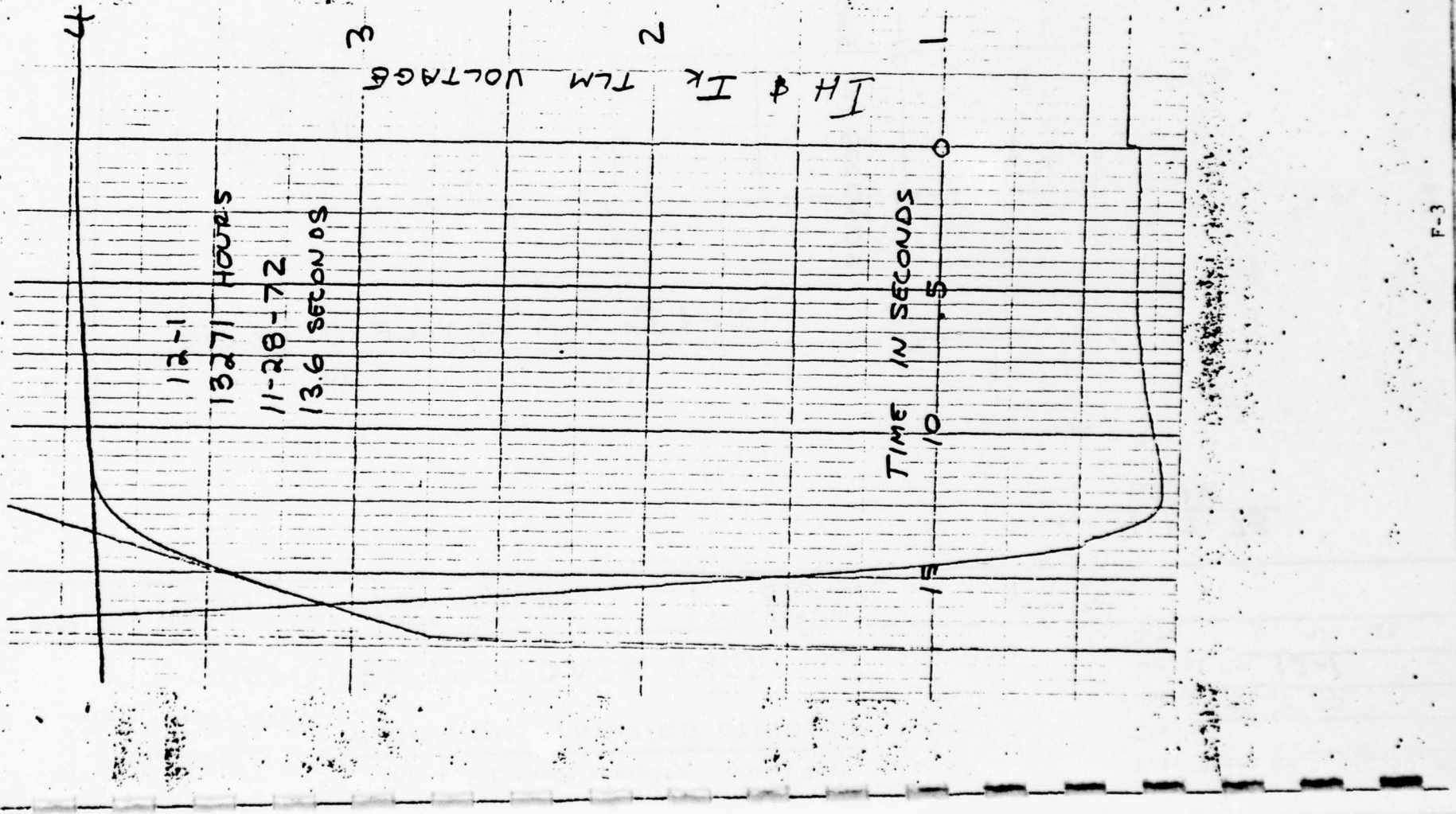
Data Sheet No. DS B20035O-400
Rev.
Model B20035O-122
Serial No. 12-1
Page 4 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 11-28-72 WPN



HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity Final Test

ELECTRON DYNAMICS DIVISION

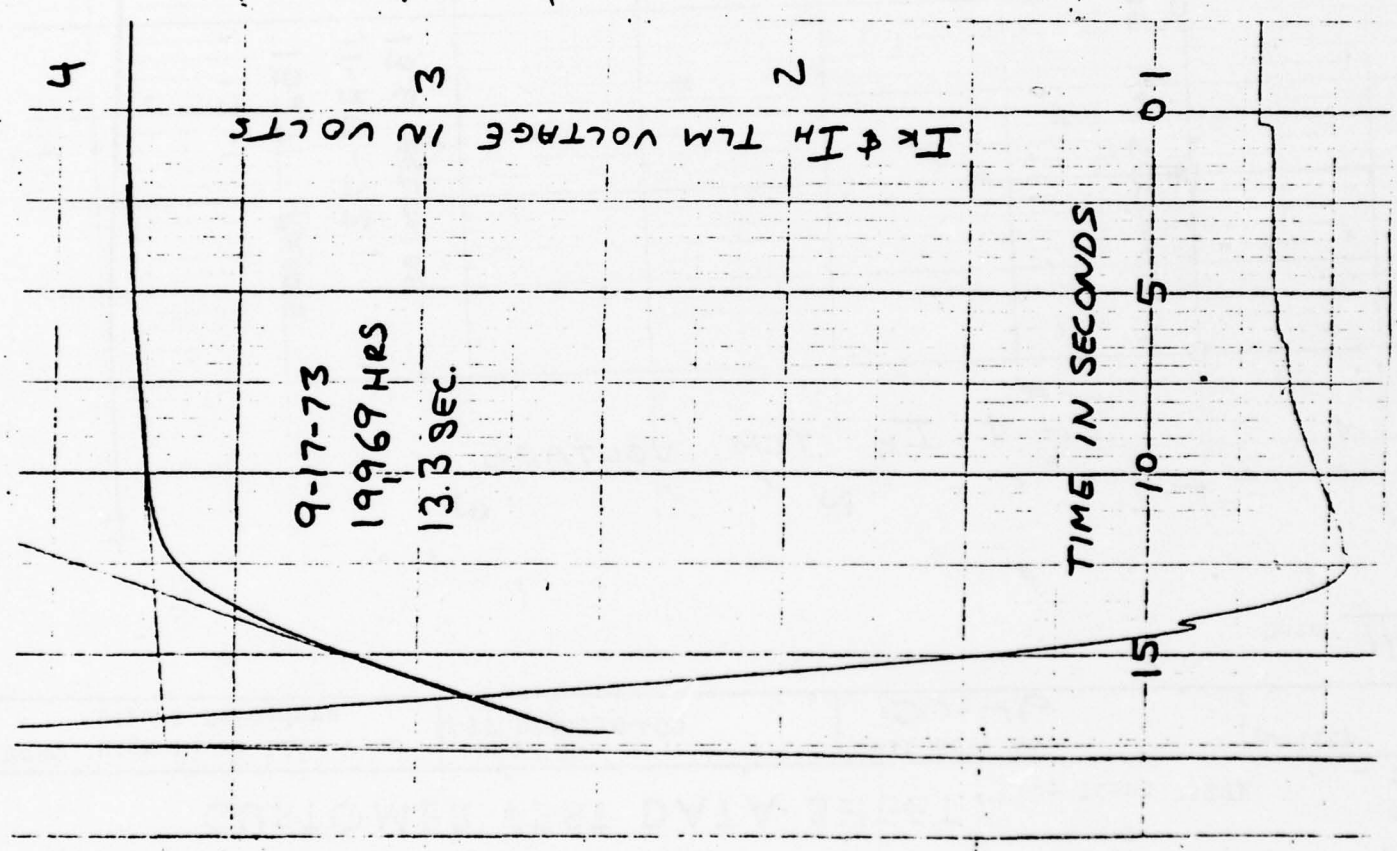
Data Sheet No. DS200350
Rev.
Model B20035 0-122
Serial No. 12-1
Page 5 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Proc. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 9-17-73
W.P.N




F-4

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

Data Sheet No. [illegible]

Rev.

Model B20035 0-121
B20035 0-122

Serial No. 12-1

Page 4 of 43

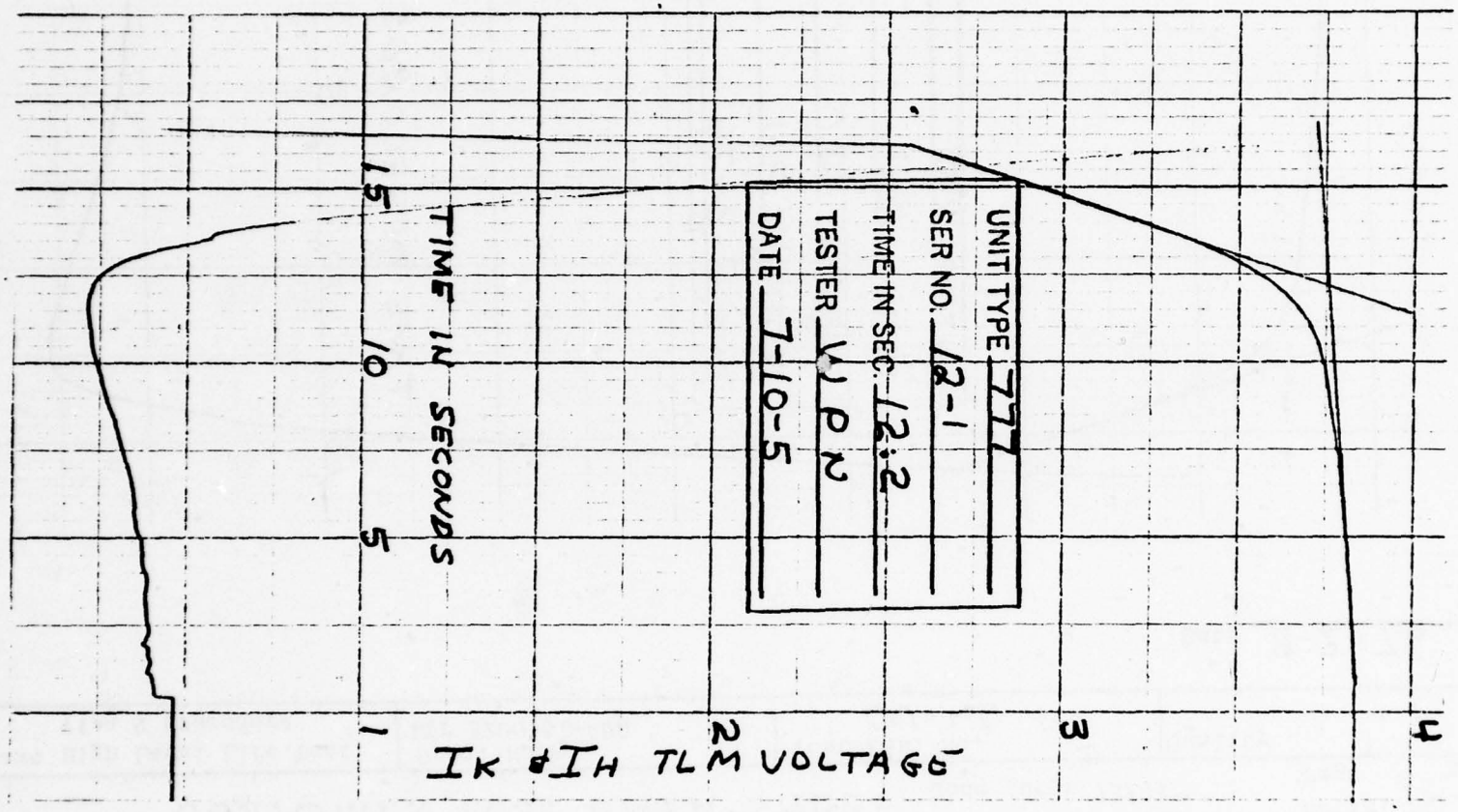
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Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | | |

35,089 HOURS

Date 7-10-5




F-5
Cathode Current (iM)

Time (sec)

Par 4.5 Cathode Activity Final Test

HUGHES
HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS DIVISION

Data Sheet No. B200350
Rev.
Model B200350-121 B200350-122
Serial No. 12-1
Page 5 of 43

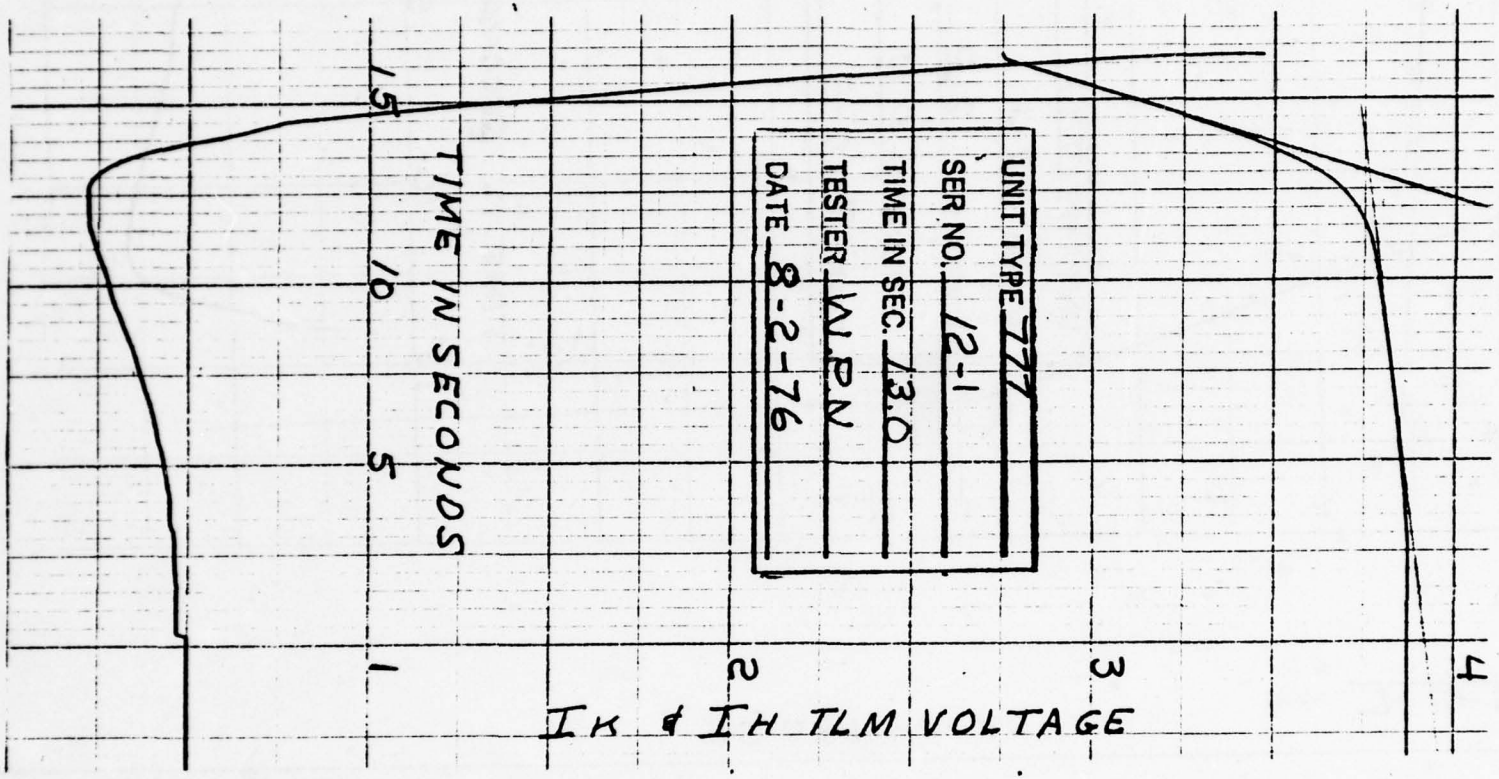
# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | QV-46 | |

44,513 HRS

Date 8-2-76



HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

Rev. B20035 0-121
Model B20035 0-122
Serial No.

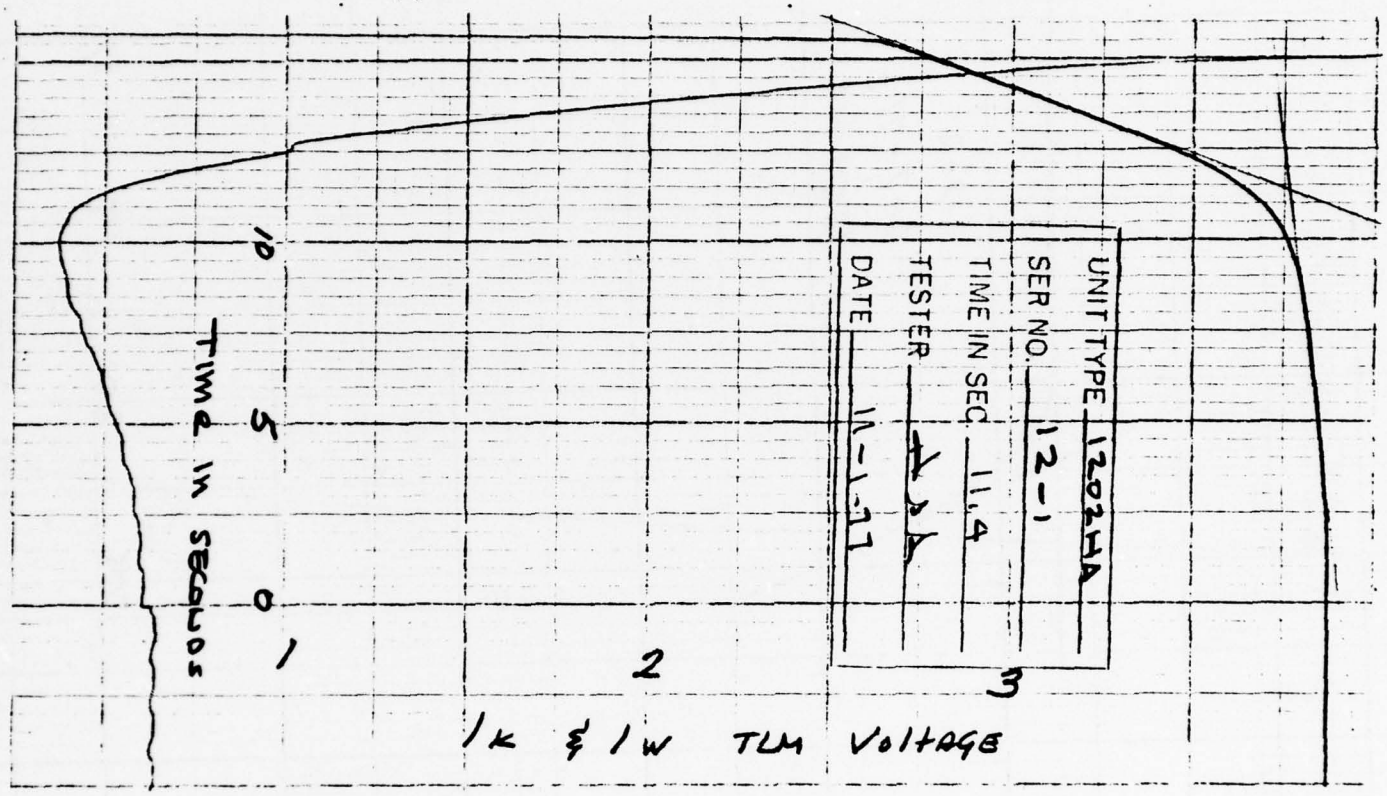
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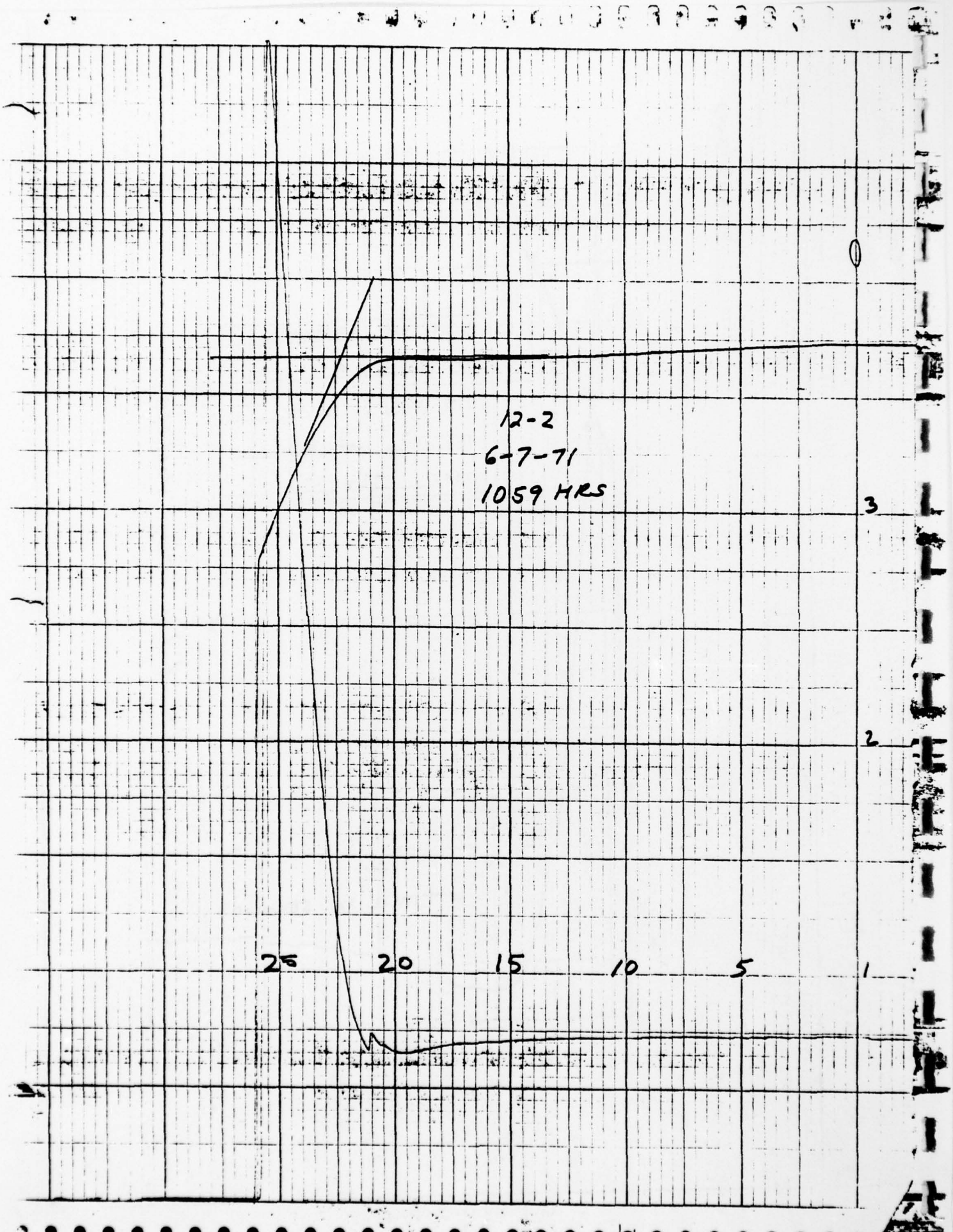
Code Ident 73293



| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | | |

Date 54334 hours




12-2
6-7-71
1059 HRS
25
20
15
10
5
3
2
1

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 13,200 Hour Test

ELECTRON DYNAMICS DIVISION

Data Sheet No. DS B20035O-[illegible]
Rev.
Model B20035O-121 B20035O-122
Serial No. 12-2
Page 4 of 43

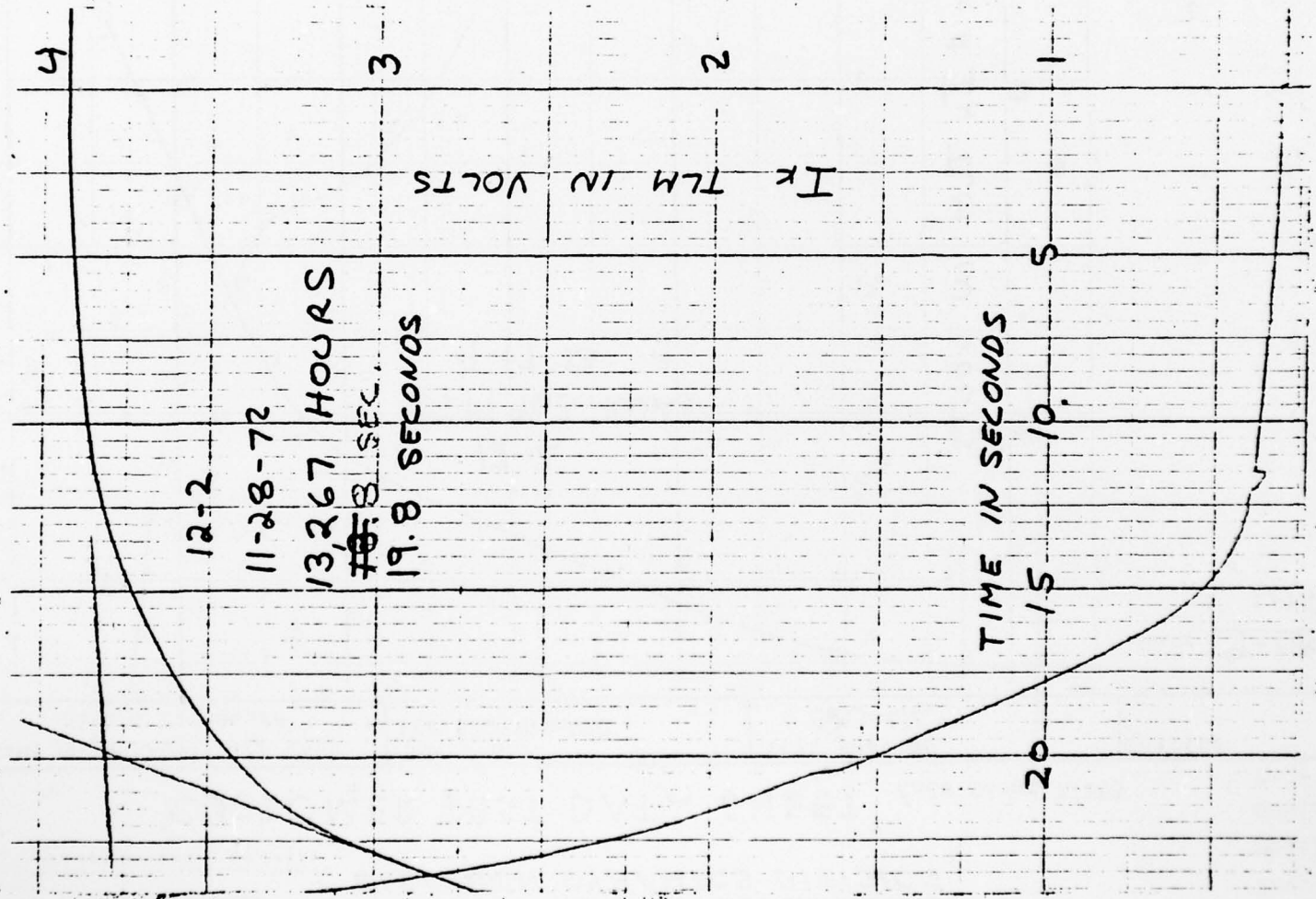
# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 11-28-72

W.P.M




F-9

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity Final Test

ELECTRON DYNAMICS DIVISION

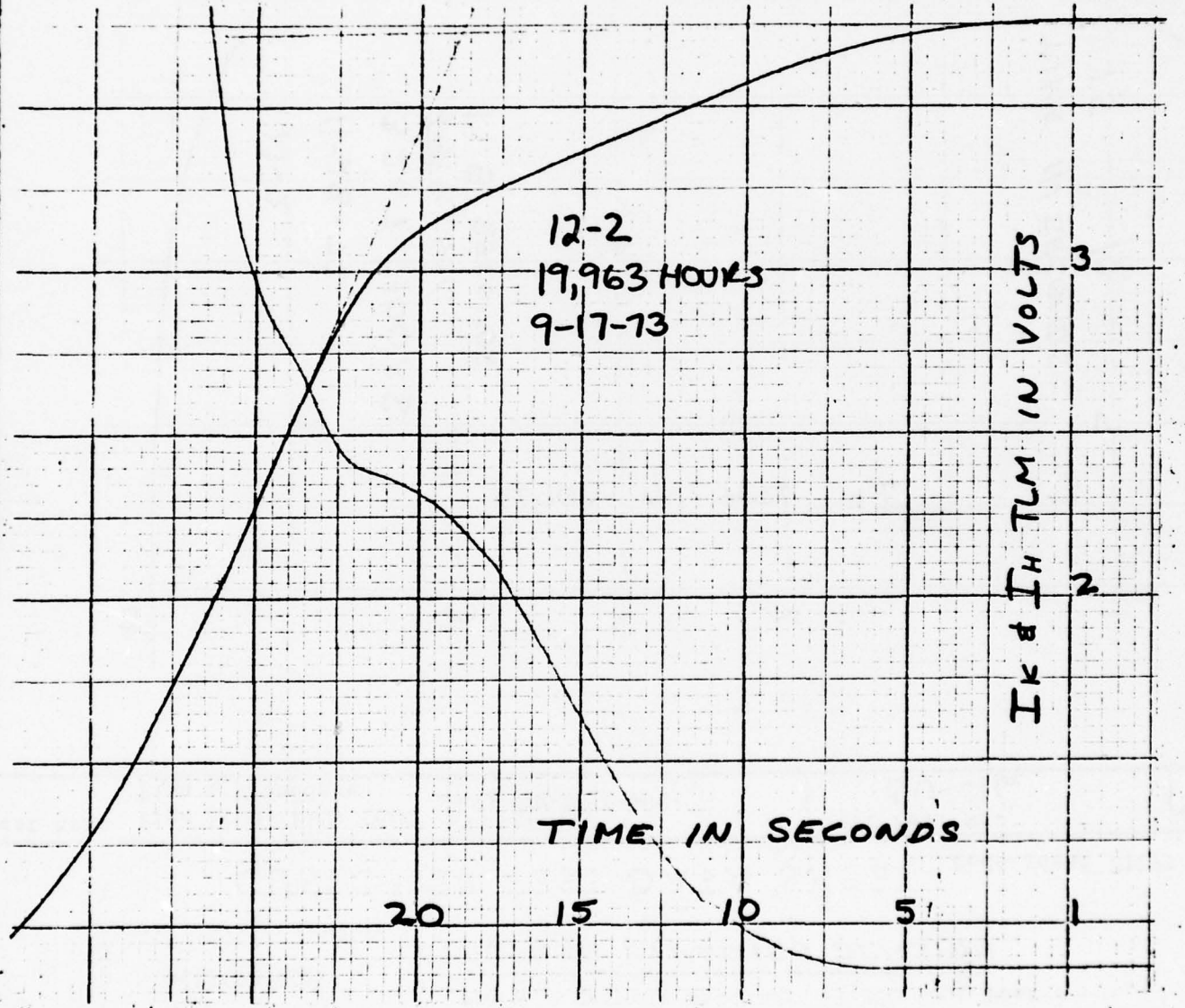
Data Sheet No. DSB200350 -42
Rev.
Model B200350-121 B200350-122
Serial No. 12-2
Page 5 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | QV-46 | |

Date 9-18-73
W.P.N.




F-10

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

# CUSTOMER TEST DATA SHEET

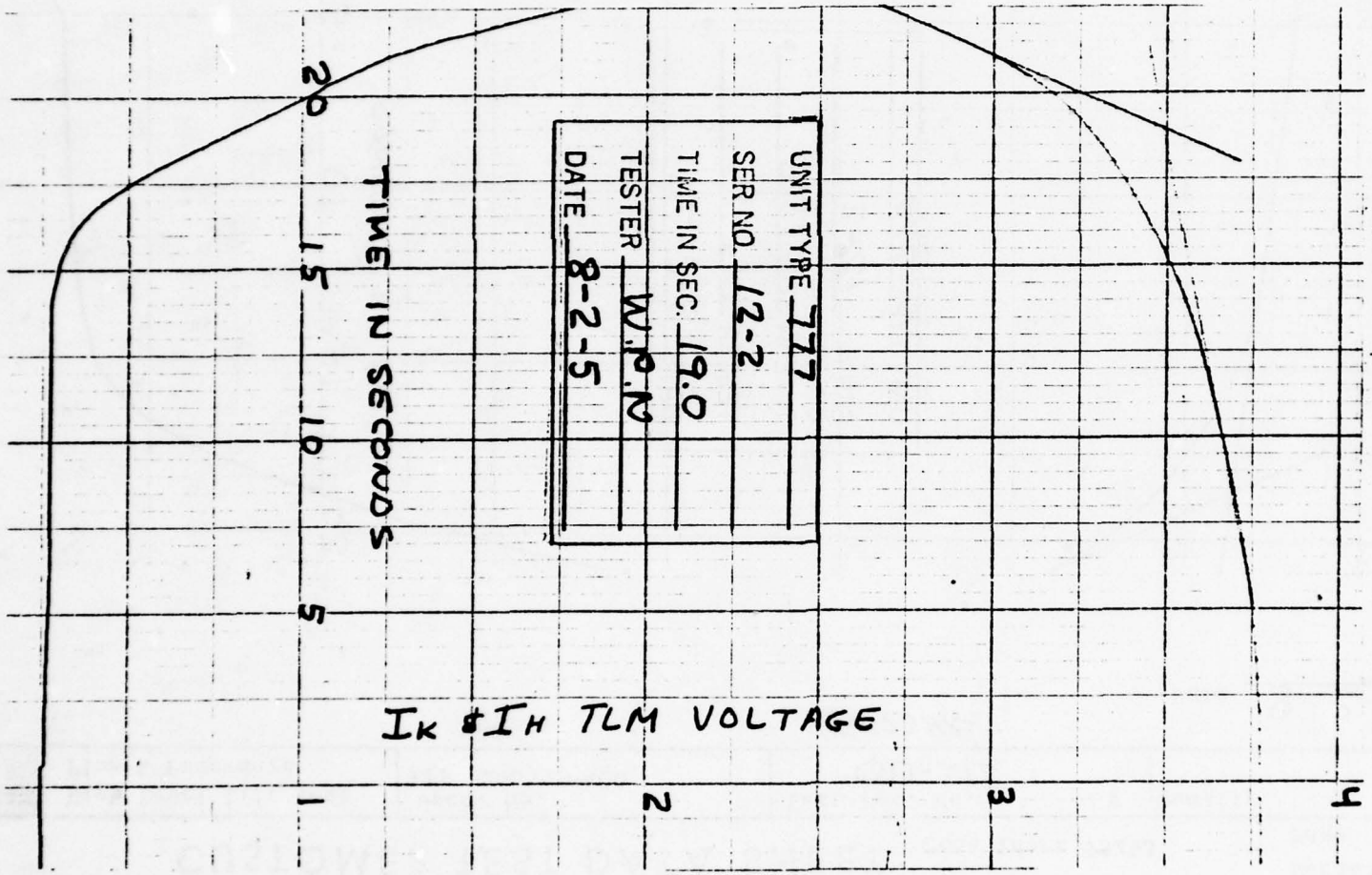
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Rev.
Model B20035 0-122
Serial No. 12-2
Page 4 of 43

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | | |

35,095

Date 8-2-5




II-F Cathode Current (μA)

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity Final Test

ELECTRON DYNAMICS DIVISION

Data Sheet No. DSB200350
Rev.
Model B200350-121 B200350-122
Serial No. 12-2
Page 5 of 43

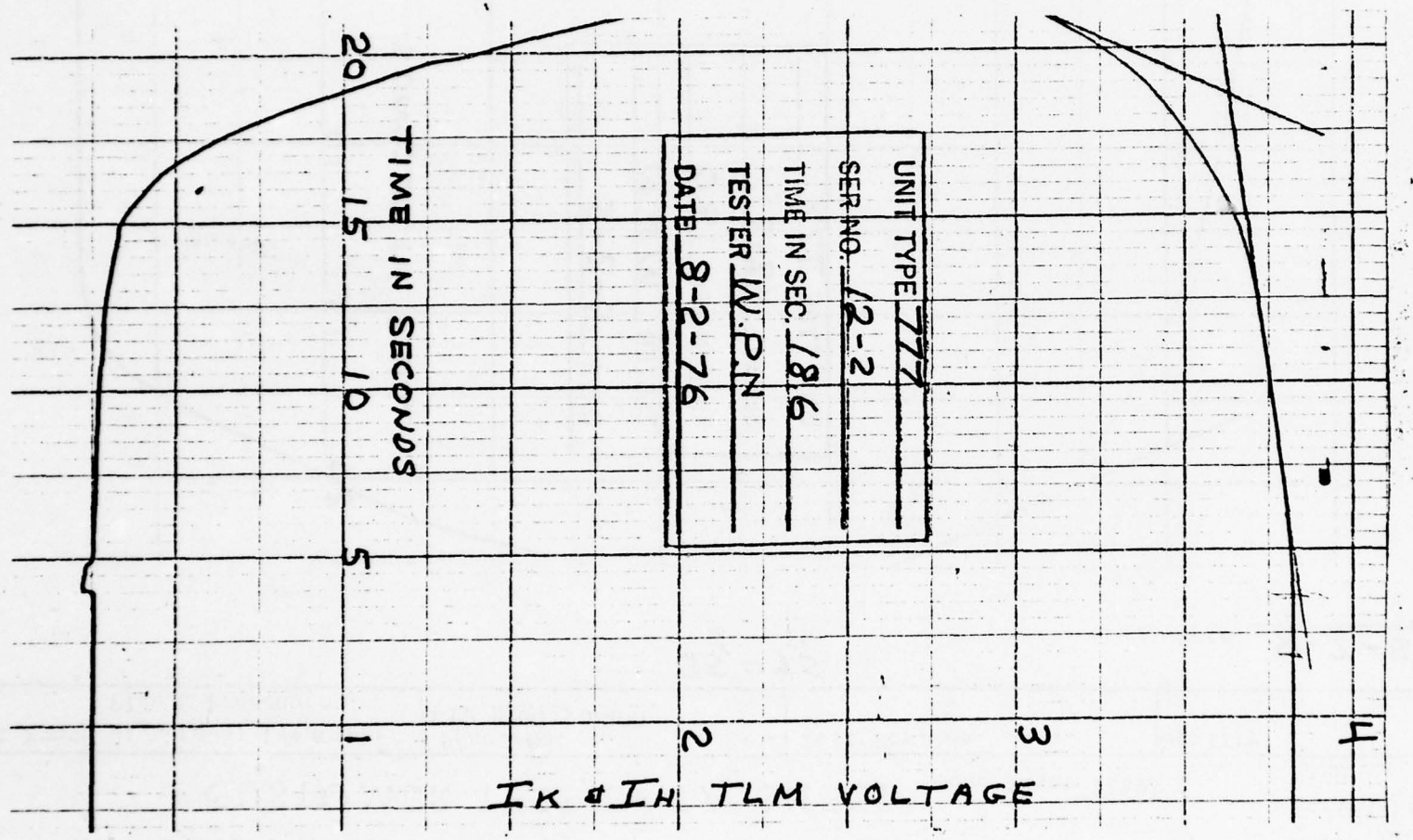
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Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | QU-46 | |

44,573 HRS

Date 8-2-76




(mA) Cathode Current

F-12

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

# CUSTOMER TEST DATA SHEET

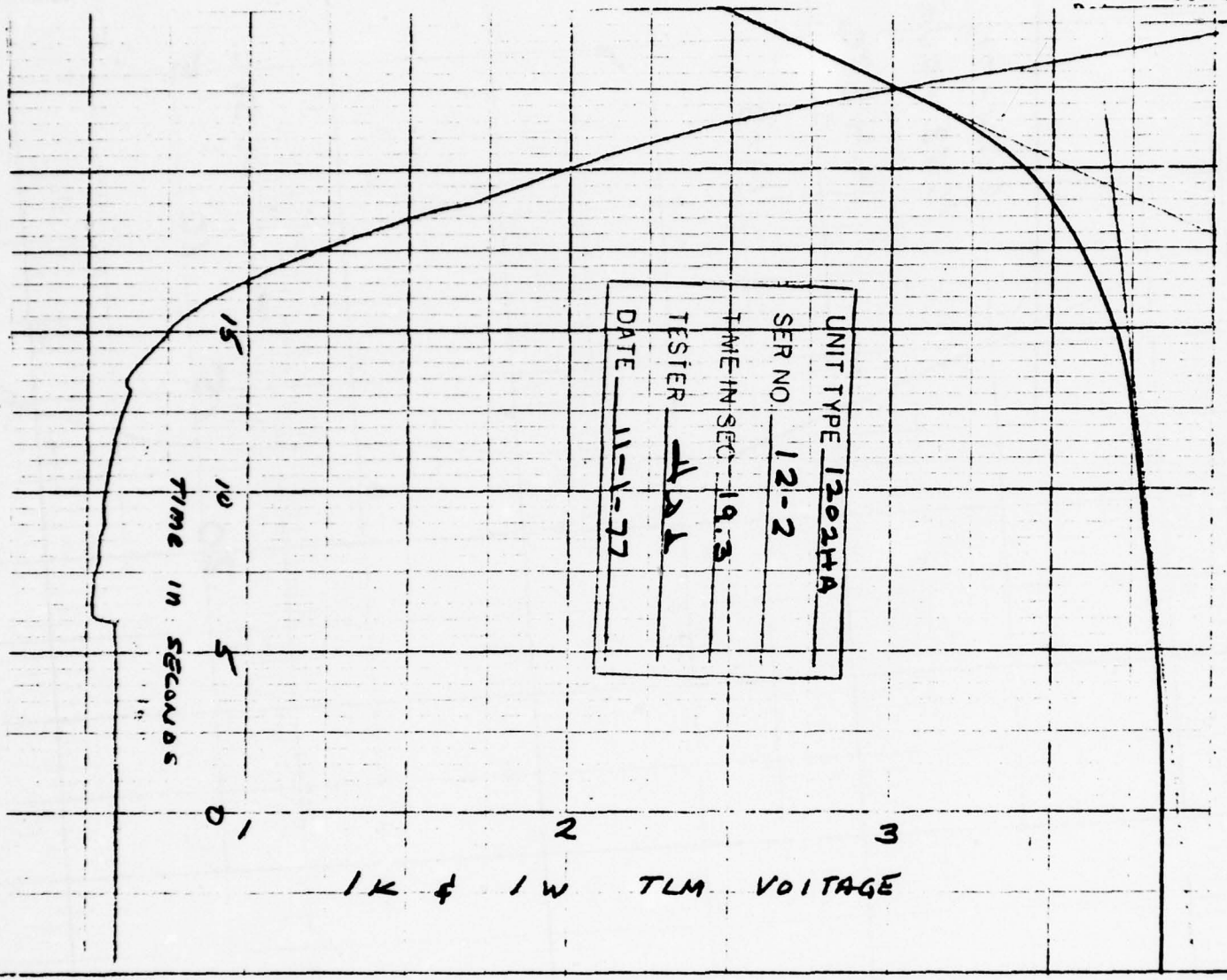
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Rev.
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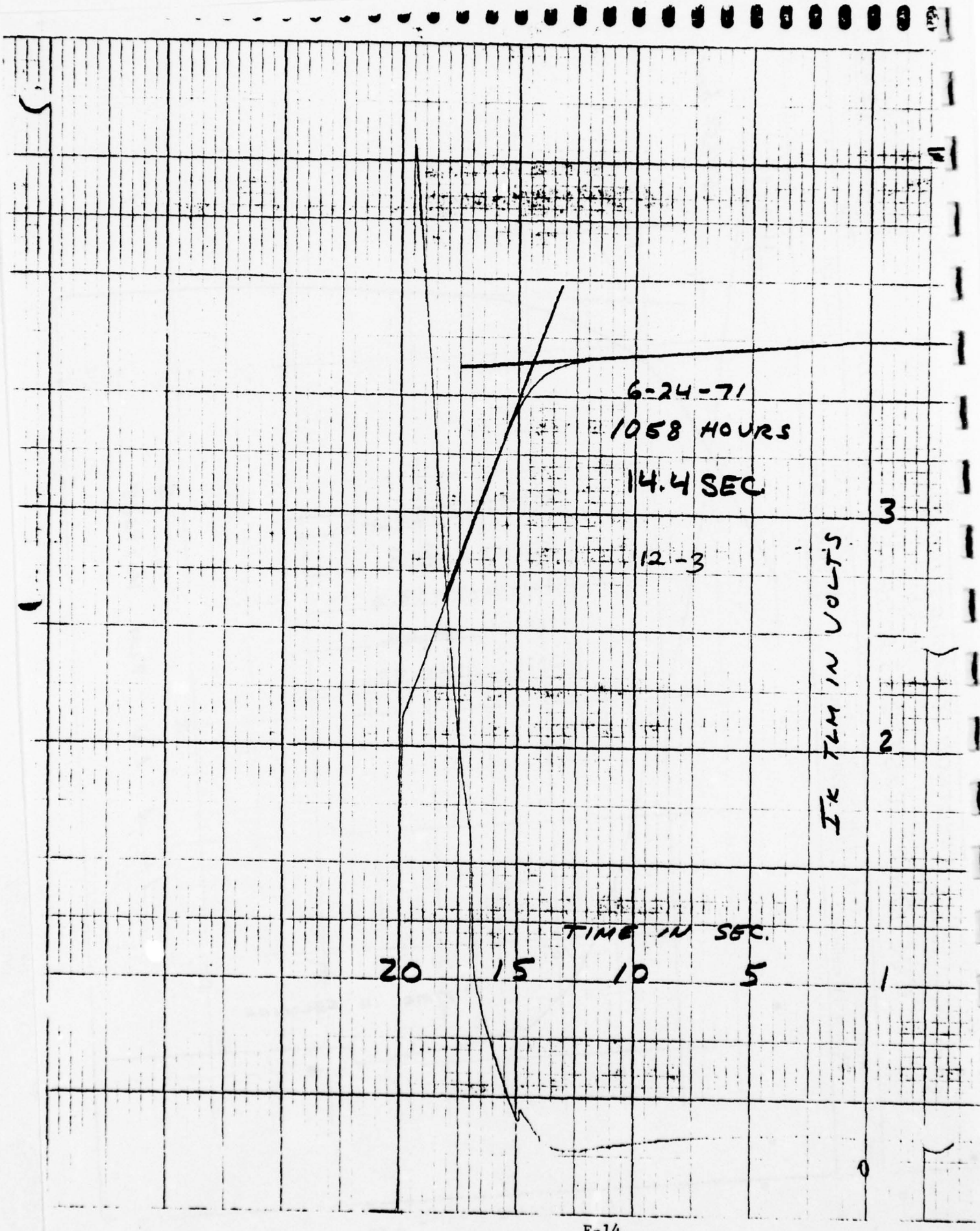
11-1-77

54651 hours




(μA) Cathode Current

F-13


6-24-71
1058 HOURS
14.4 SEC.
12-3
IR TEM IN VOLTS
TIME IN SEC.
20
15
10
5
3
2
1
0

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

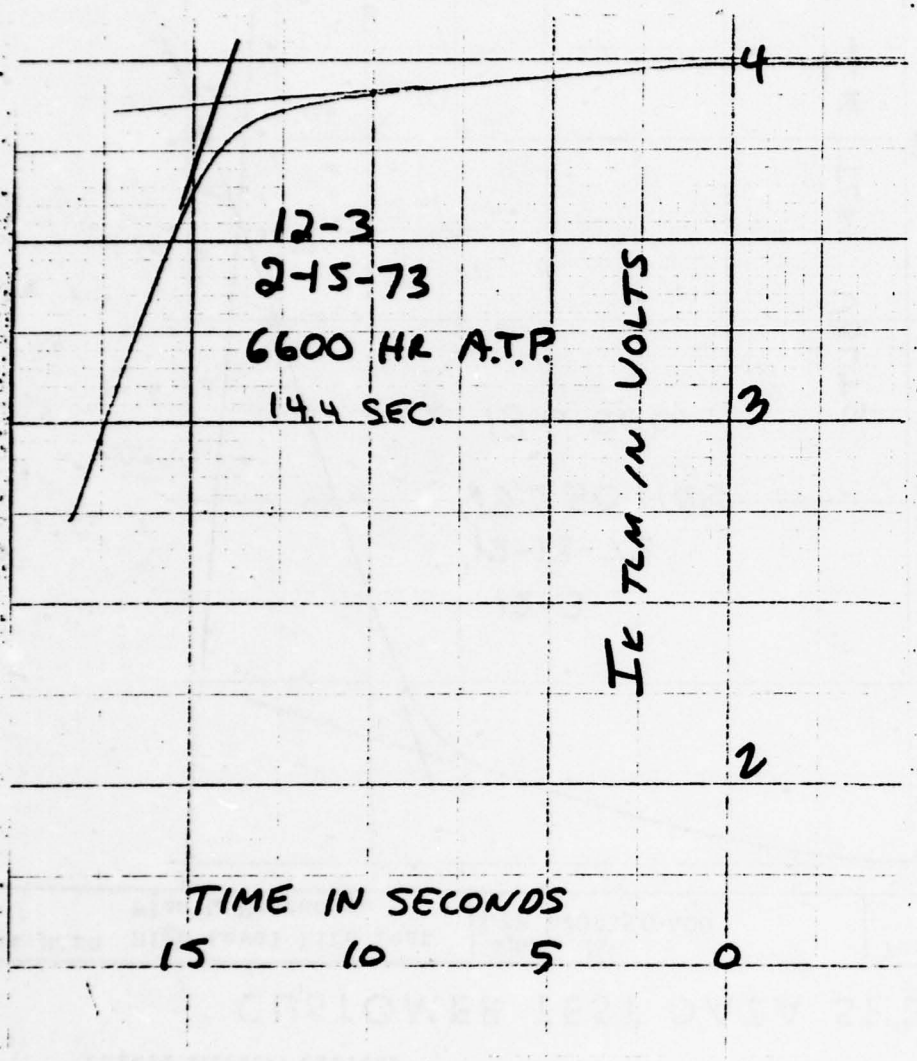
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Code Ident 73293

Rev.
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Serial No. 12-3


| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 2-15-72
W.P.M



HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 13,200 Hour Test

ELECTRON DYNAMICS DIVISION

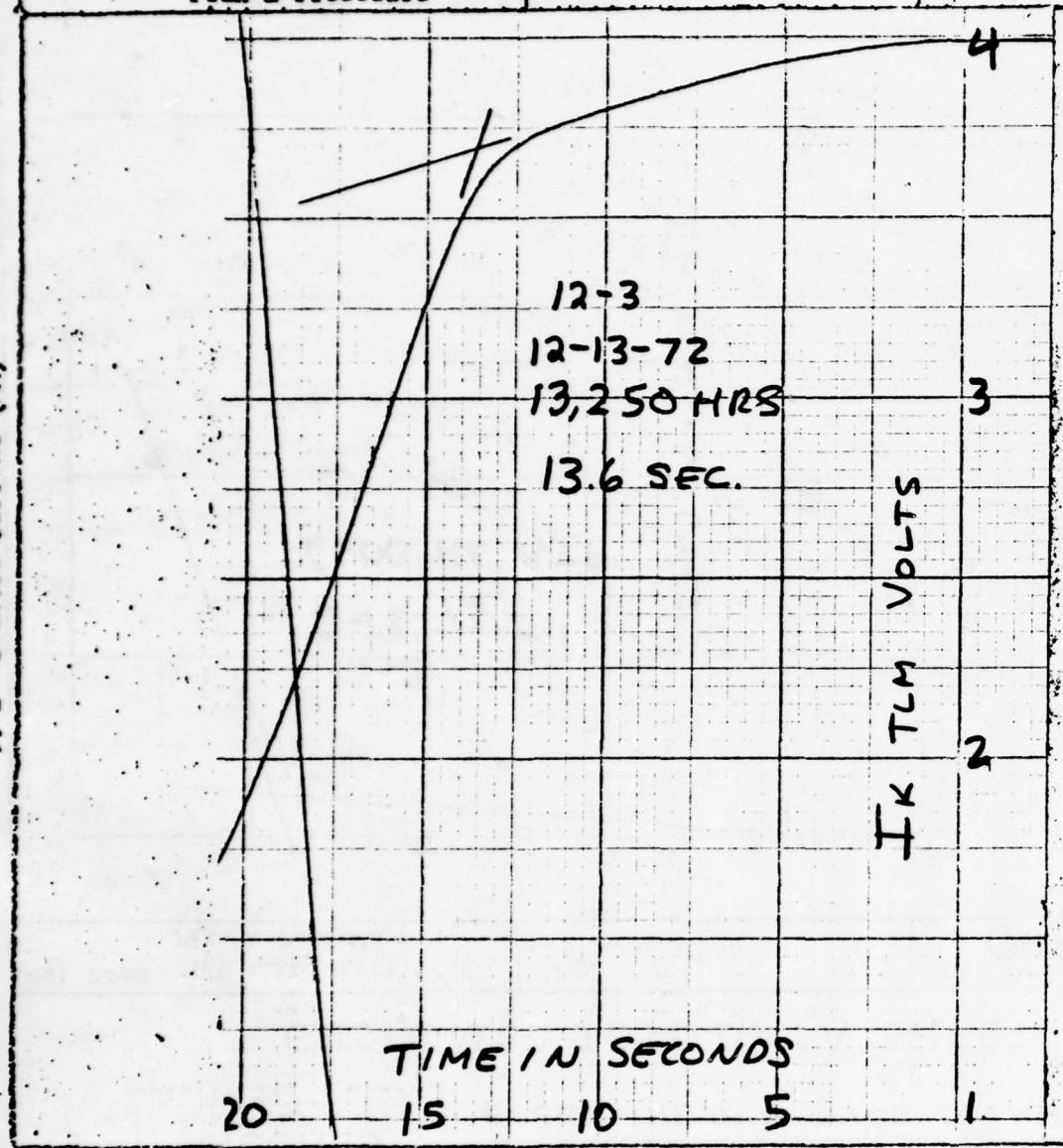
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Rev.
Model B20035O-121 122
Serial No. 12-3
Page 4 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | ΦU-46 | |

Date 12-13-72
W.P. 71



HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity Final Test

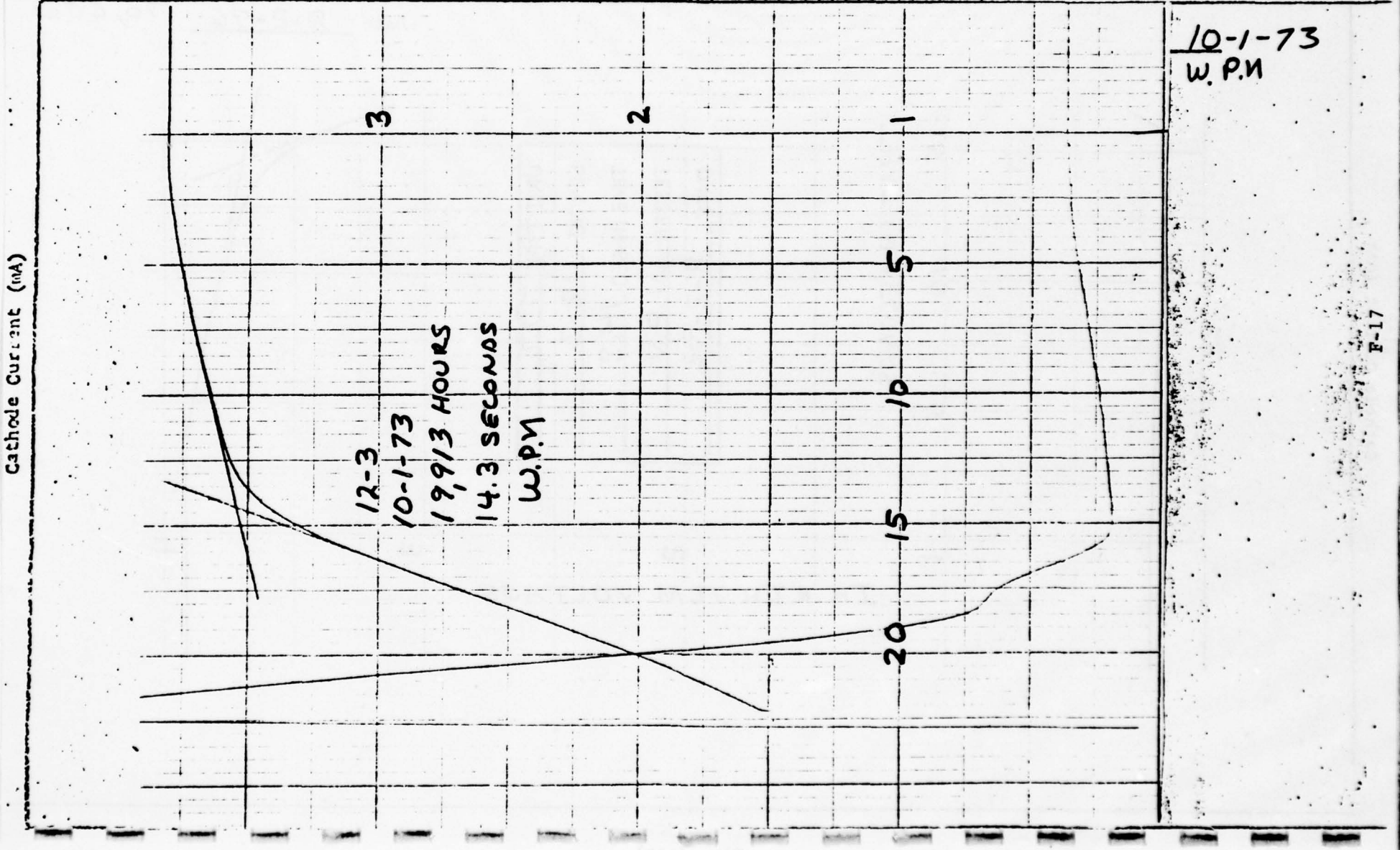
ELECTRON DYNAMICS DIVISION

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Rev.
Model B200350-121 B200350-122
Serial No. 12-3
Page 5 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | QU-46 | |



HUGHES
HUGHES AIRCRAFT COMPANY

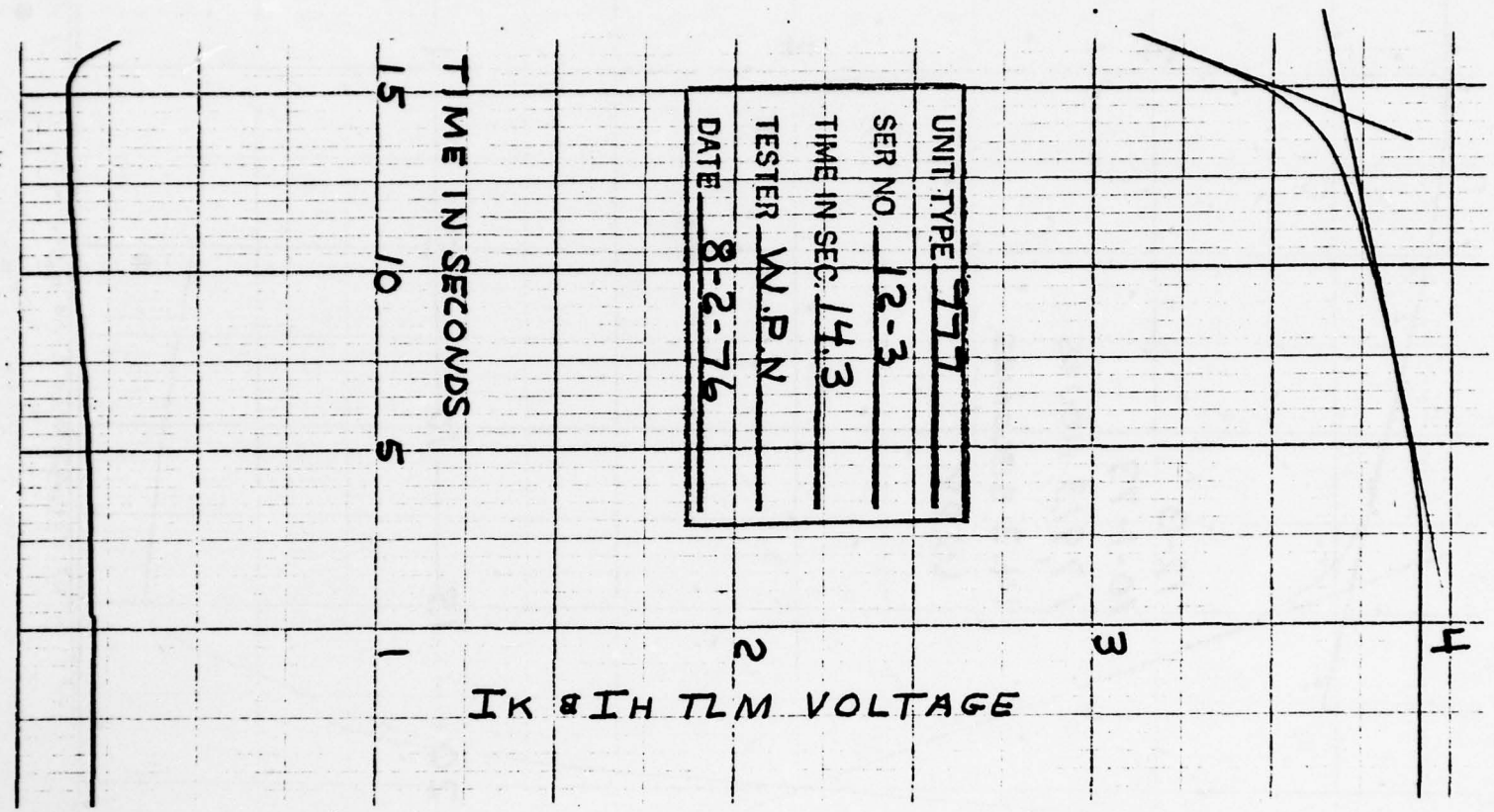
ELECTRON DYNAMICS DIVISION

Rev.
Model B20035 0-121
Serial No. 12-3
Page 5 of 43

# CUSTOMER TEST DATA SHEET Code Ident 73293

| Test Name | Spec. No. | Test Proc. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 8-2-76 46,285




F-18
Cathode Current (mA)

Time (sec)

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

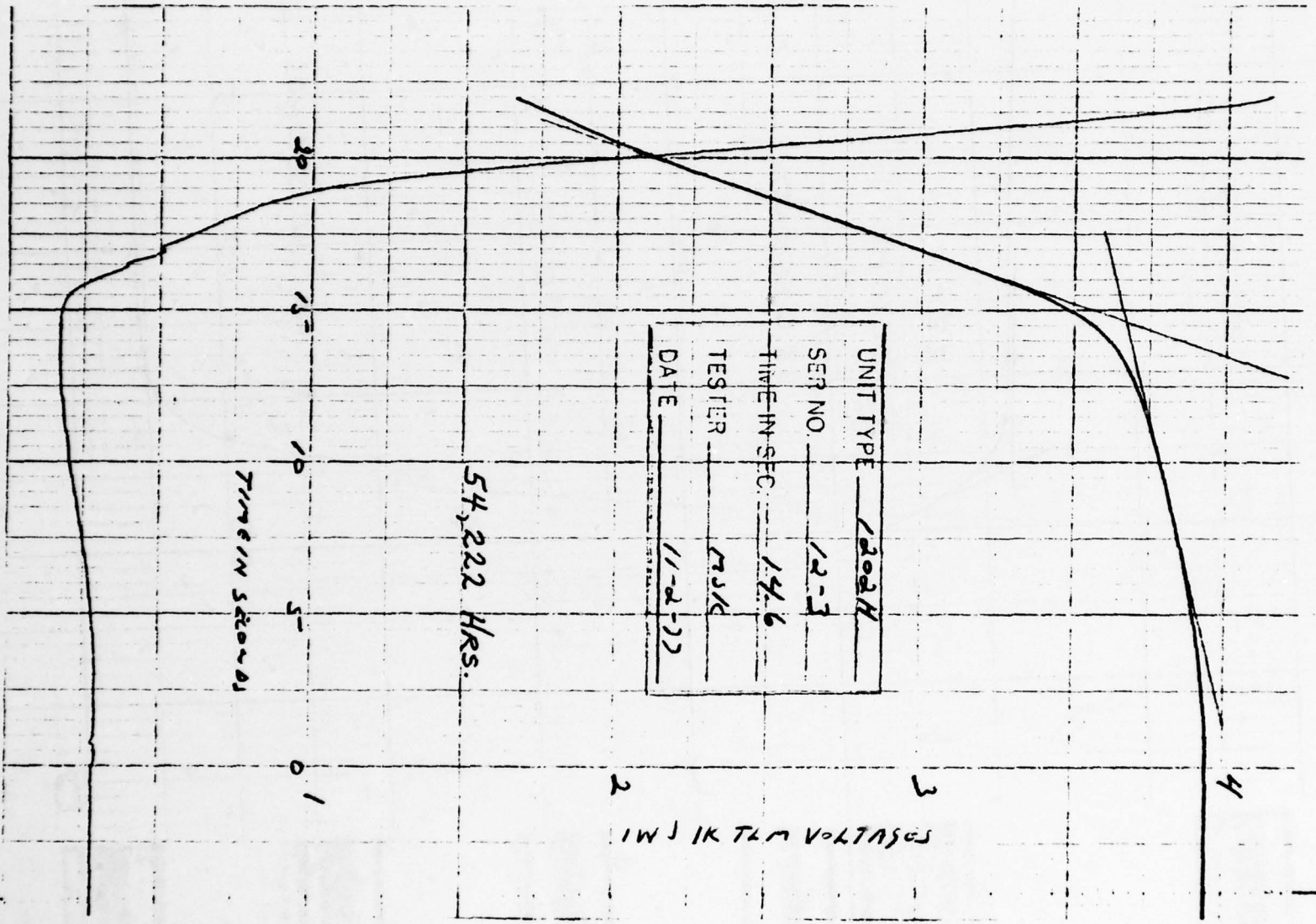
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Rev.
Model B20035 0-121
B20035 0-122
Serial No. 12-3
Page 3 of 43

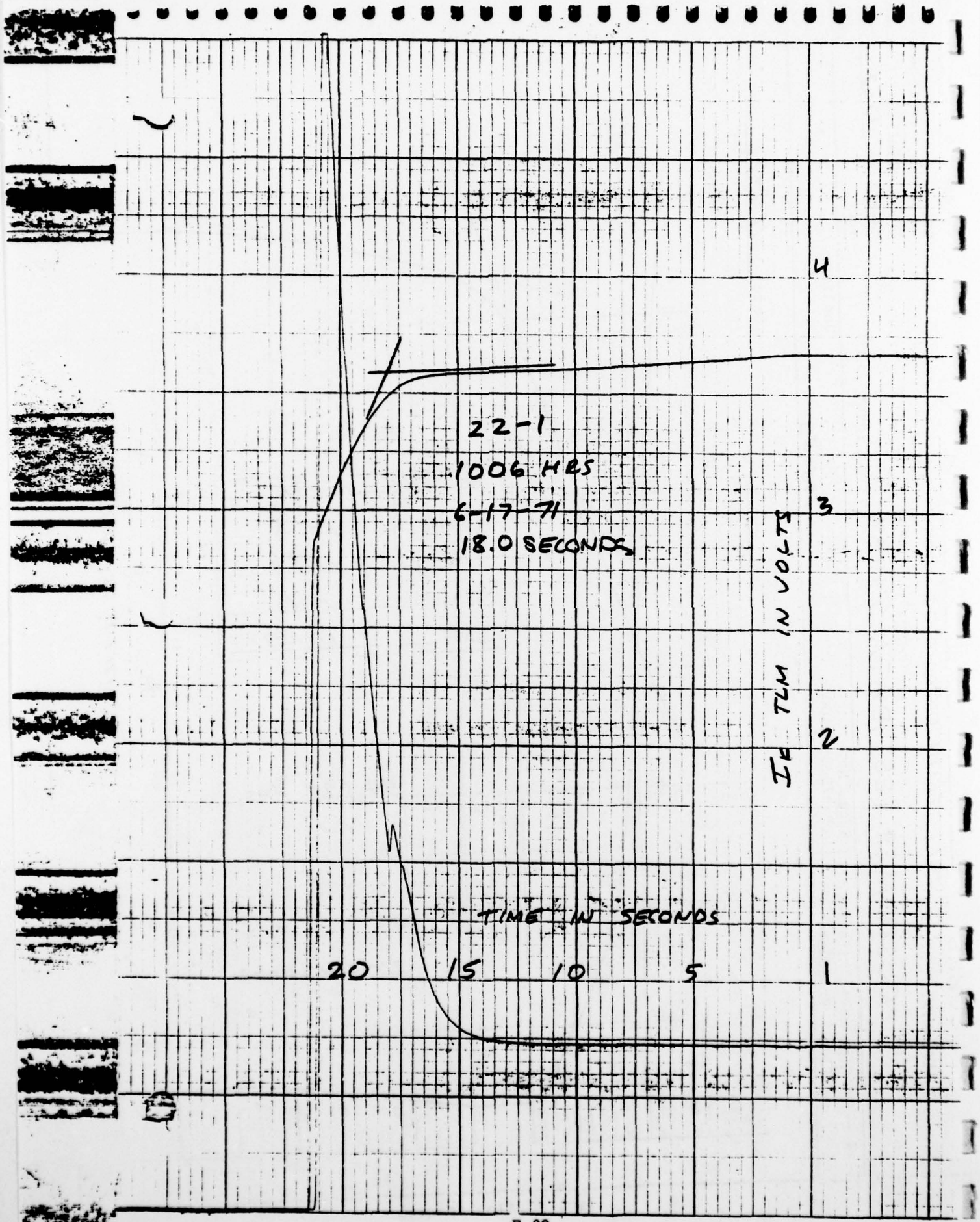
| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | 19805-3 | |

Date 11-2-77




Cathode Current (A)

F-19


22-1
1006 HRS
6-17-71
18.0 SECONDS
4
3
2
1
IF TLM IN VOLTS
TIME IN SECONDS
20
15
10
5

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 13,200 Hour Test

ELECTRON DYNAMICS DIVISION

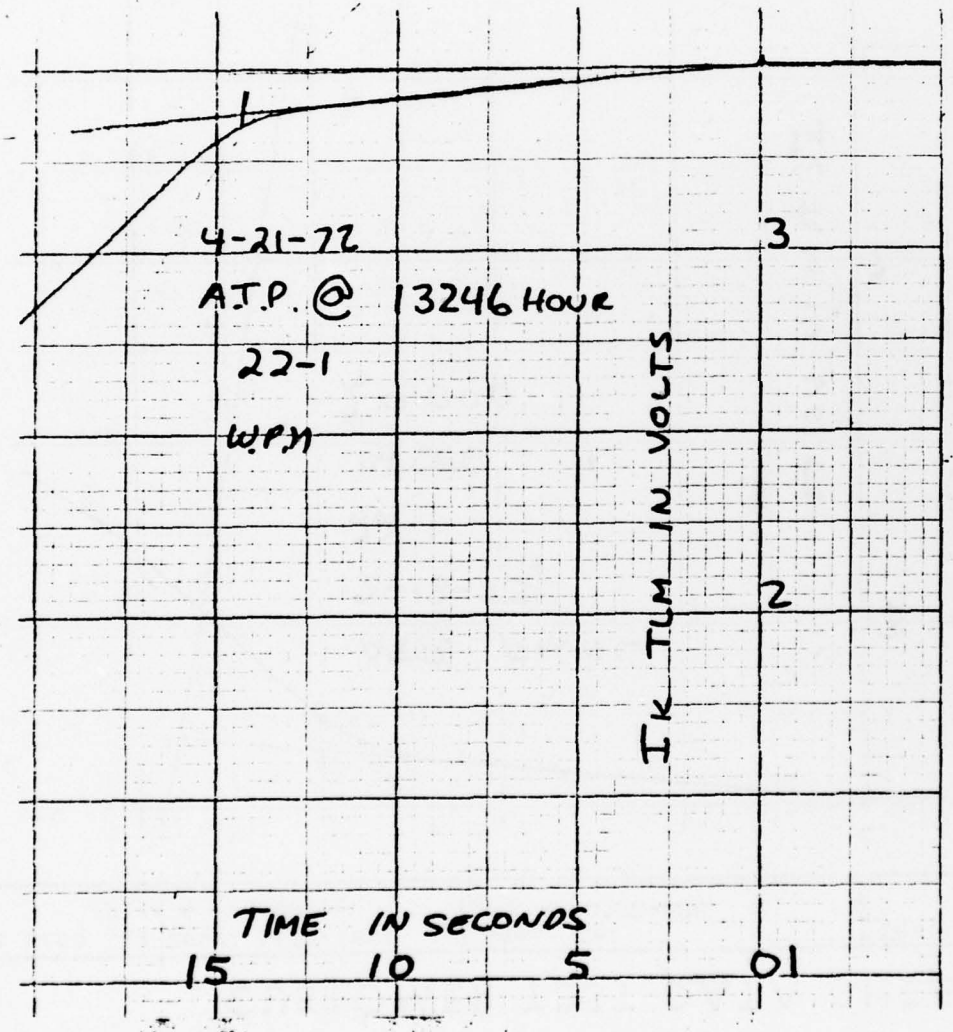
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Model B200300-121 B200300-122
Serial No. 22-1
Page 3 of 38

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| Low Level Life Test Plan & Procedure | LTP B200300-400 | QU-46 | |

Date 4-21-72




F-21

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

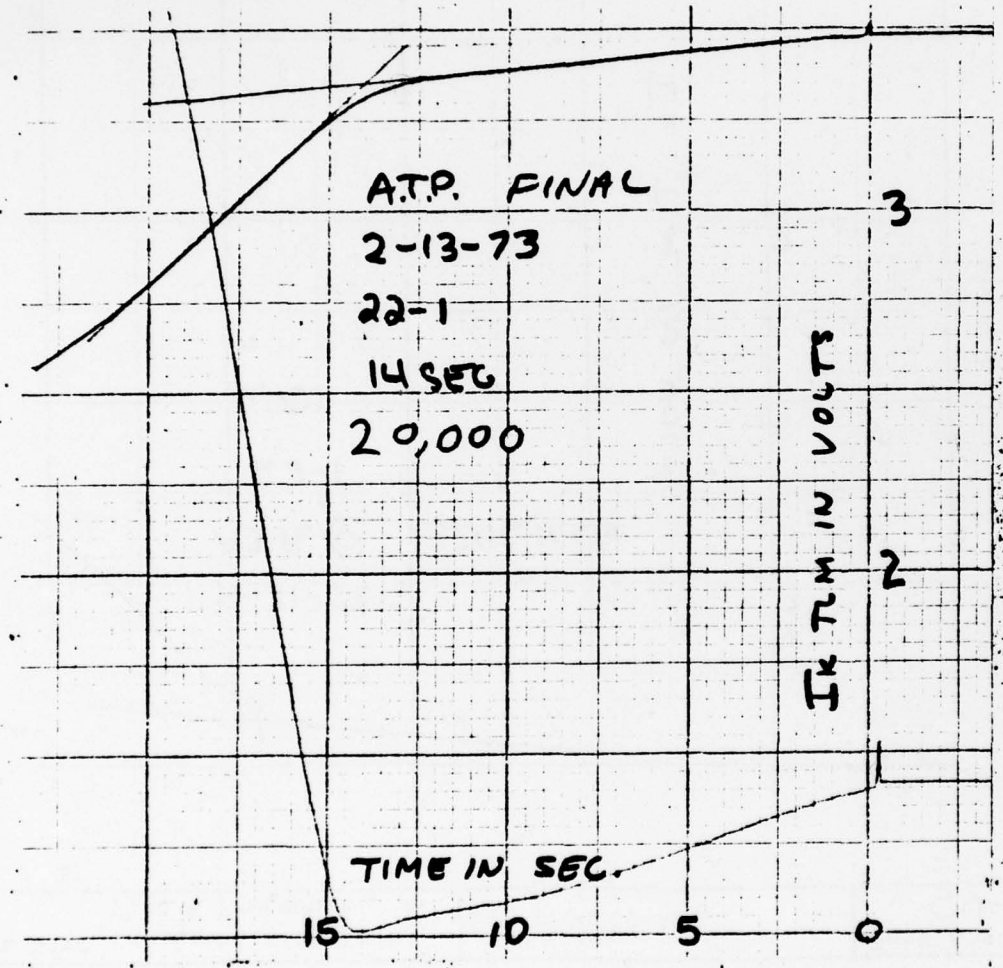
# CUSTOMER TEST DATA SHEET

Code Ident 73293

Rev.
Model B200300-121 122
Serial No. 22-1
Page 4 of 38

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| Low Level Life Test Plan & Procedure. | LTP B200300-400 | QU-46 | |

Date 2-13-73
W.P.M




Cathode Current (mA)

F-22

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

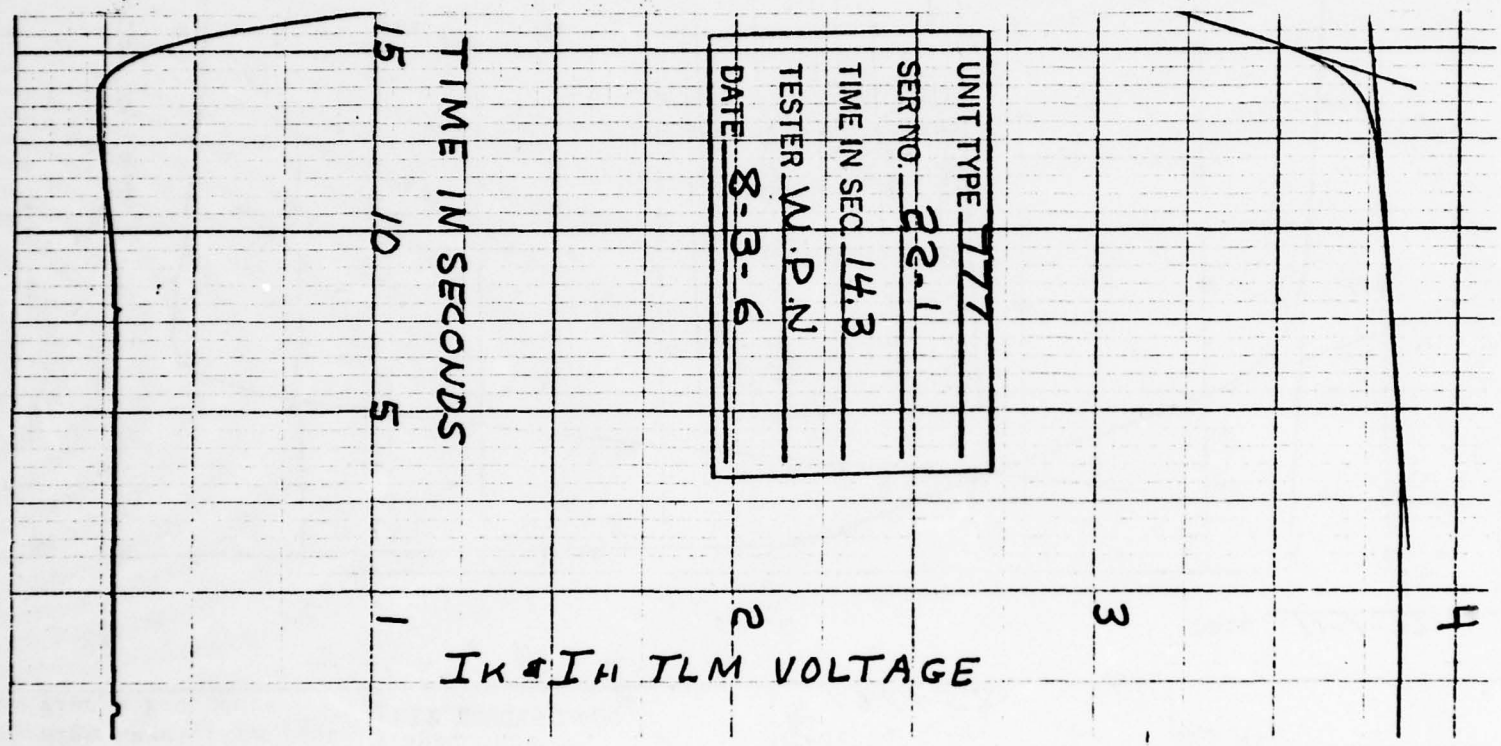
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Code Ident 73293

Rev. B200350-121
Model B200350-122
Serial No. 22-1


| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | QU-46 | |

Date 8-3-6
43,612




Cathode current (mA)



Time (sec)

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

# CUSTOMER TEST DATA SHEET

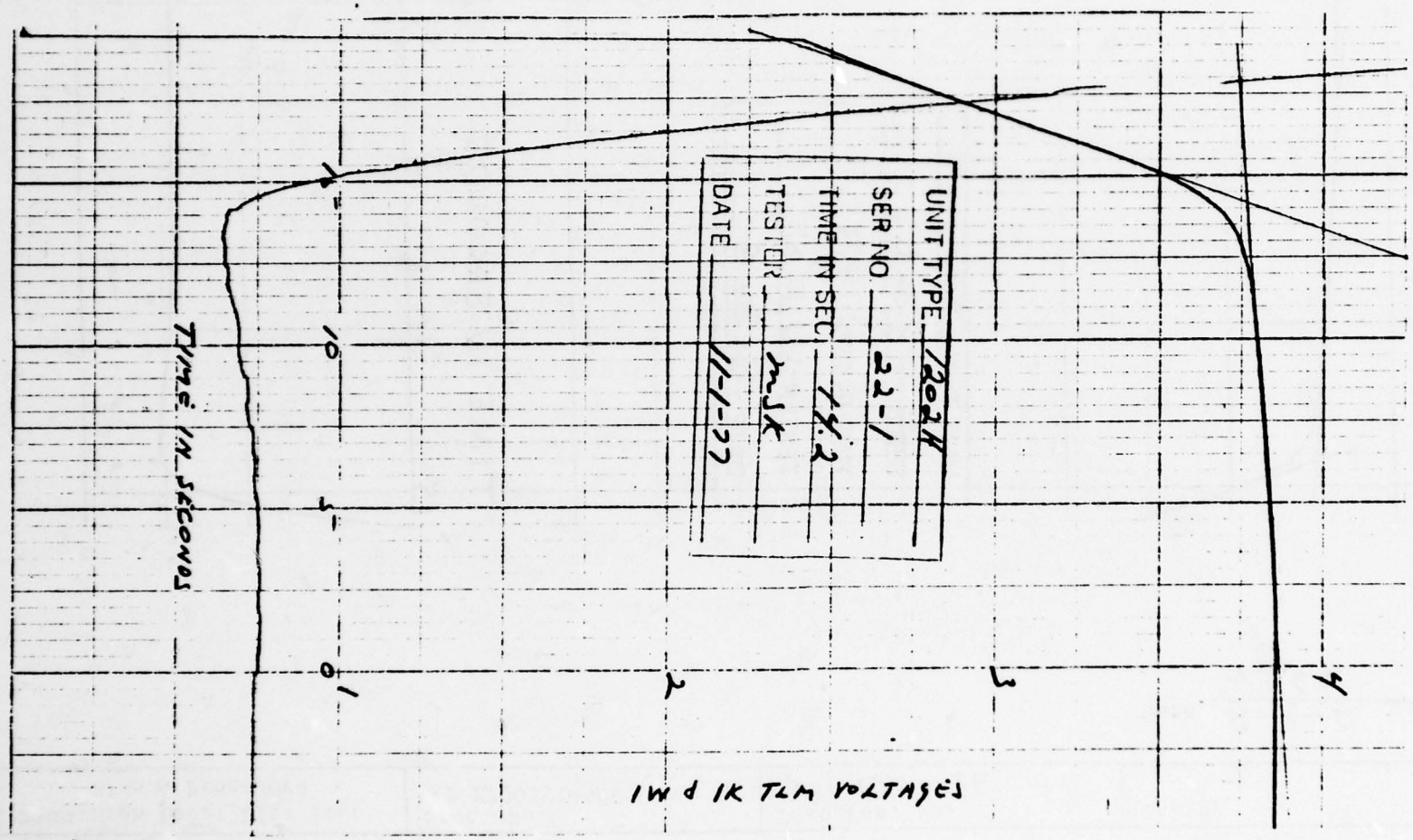
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Data Sheet No. [illegible]
Rev.
Model B20035 0-121
B20035 0-122
Serial No. 22-1
Page 3 of 43

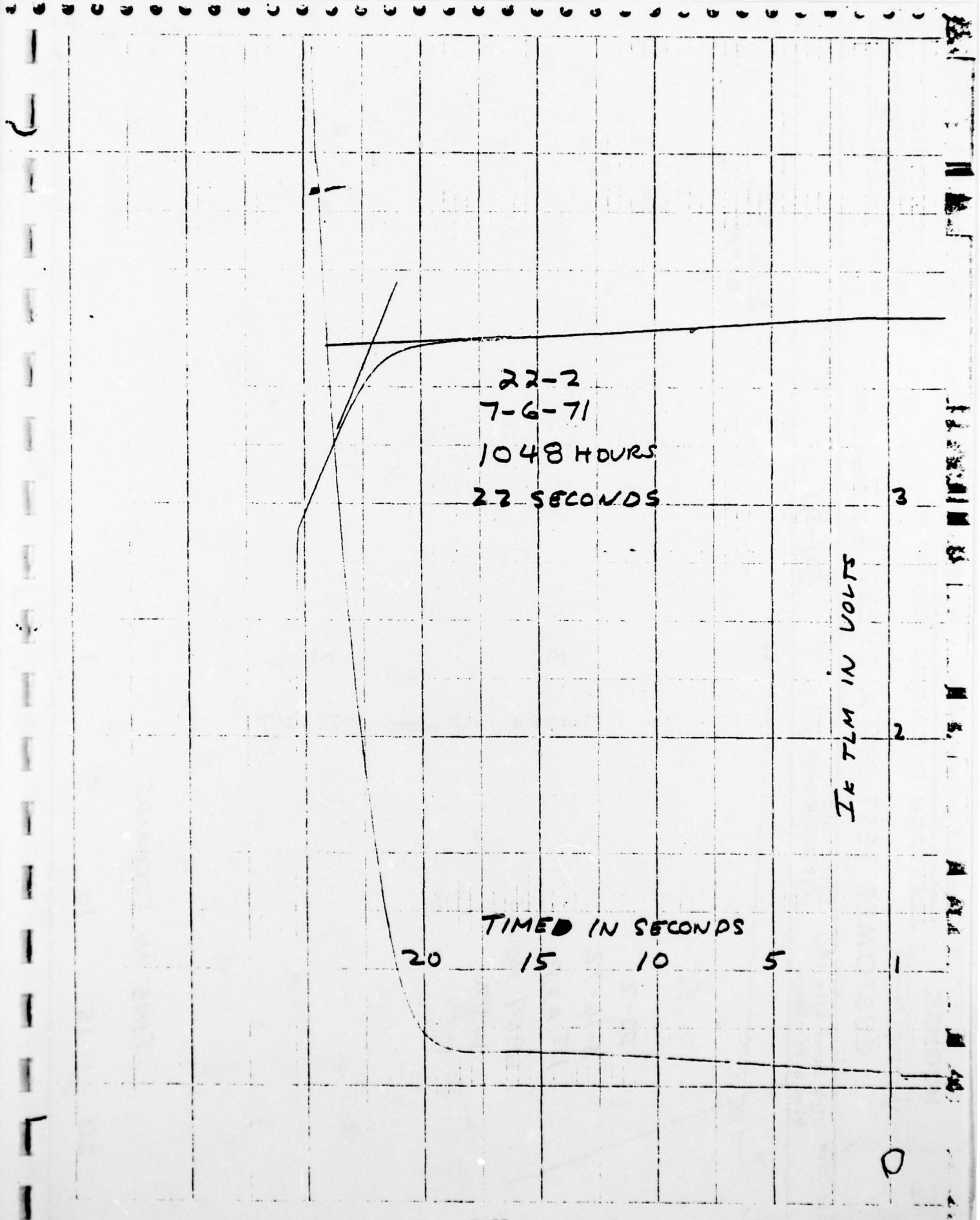
| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | 198053 | |

Date 11-1-77

50066 hours




Circle one (W) Current
F-24


22-2
7-6-71
1048 HOURS
22 SECONDS
TIME IN SECONDS
20
15
10
5
3
2
1
0
IK TLM IN VOLTS

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 6000 Hour Test

ELECTRON DYNAMICS DIVISION

Data Sheet No. DS B20035 0-40
Rev.
Model B20035 0-121 B20035 0-122
Serial No. 22-2
Page 3 of 43

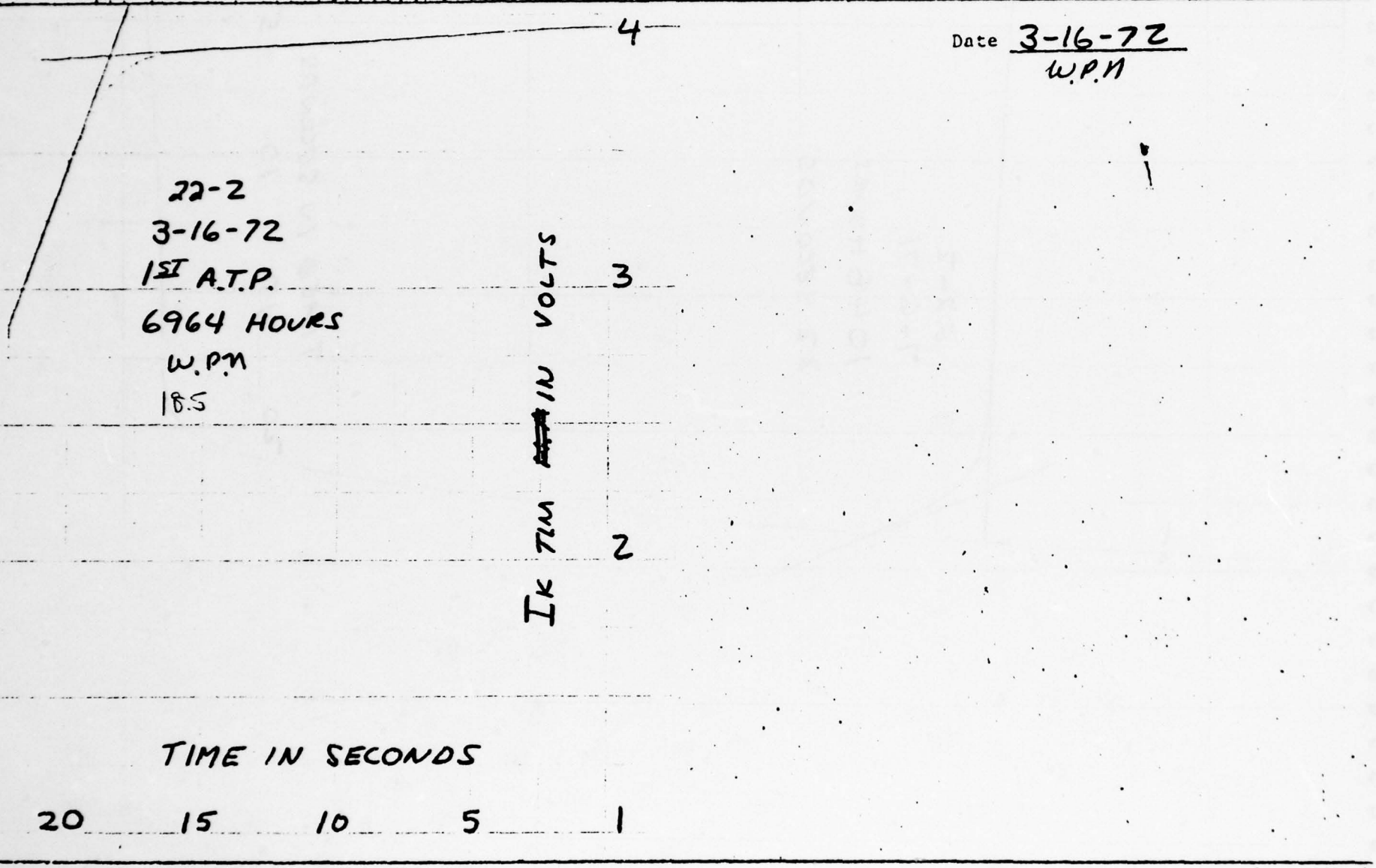
# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 3-16-72
W.P.M

22-2
3-16-72
1ST A.T.P.
6964 HOURS
W.P.M
18.5




F-26

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

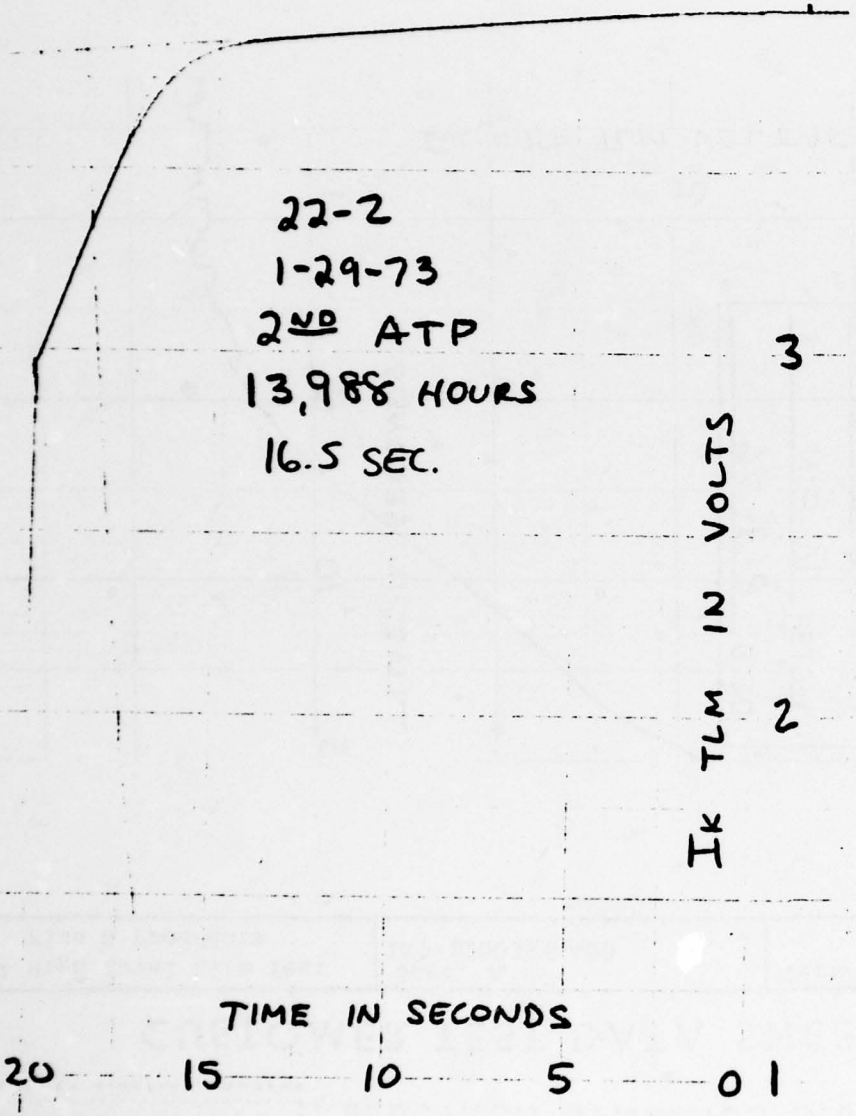
# CUSTOMER TEST DATA SHEET

Code Ident 73293

Rev.
Model B20035 0-122
Serial No. 22-2
Page 4 of 43

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 1-29-73




(Rev. 1/68) Supersedes Form F-27

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

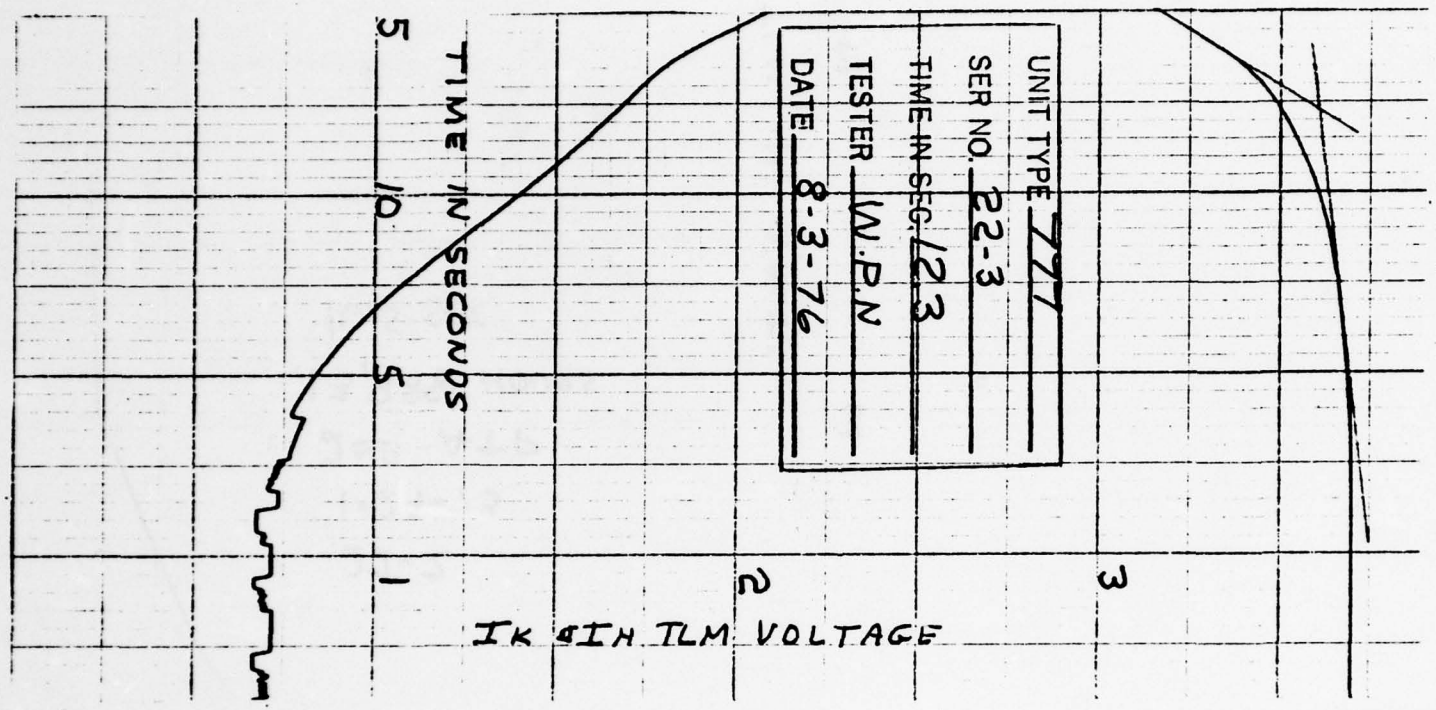
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Rev. [illegible]
Model B20035 0- 1 2
Serial No. 22-3
Page 5 of 43

# CUSTOMER TEST DATA SHEET

Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 8-3-6
42098




Time (sec)

HUGHES
HUGHES AIRCRAFT COMPANY
ELECTRON DYNAMICS DIVISION

# CUSTOMER TEST DATA SHEET

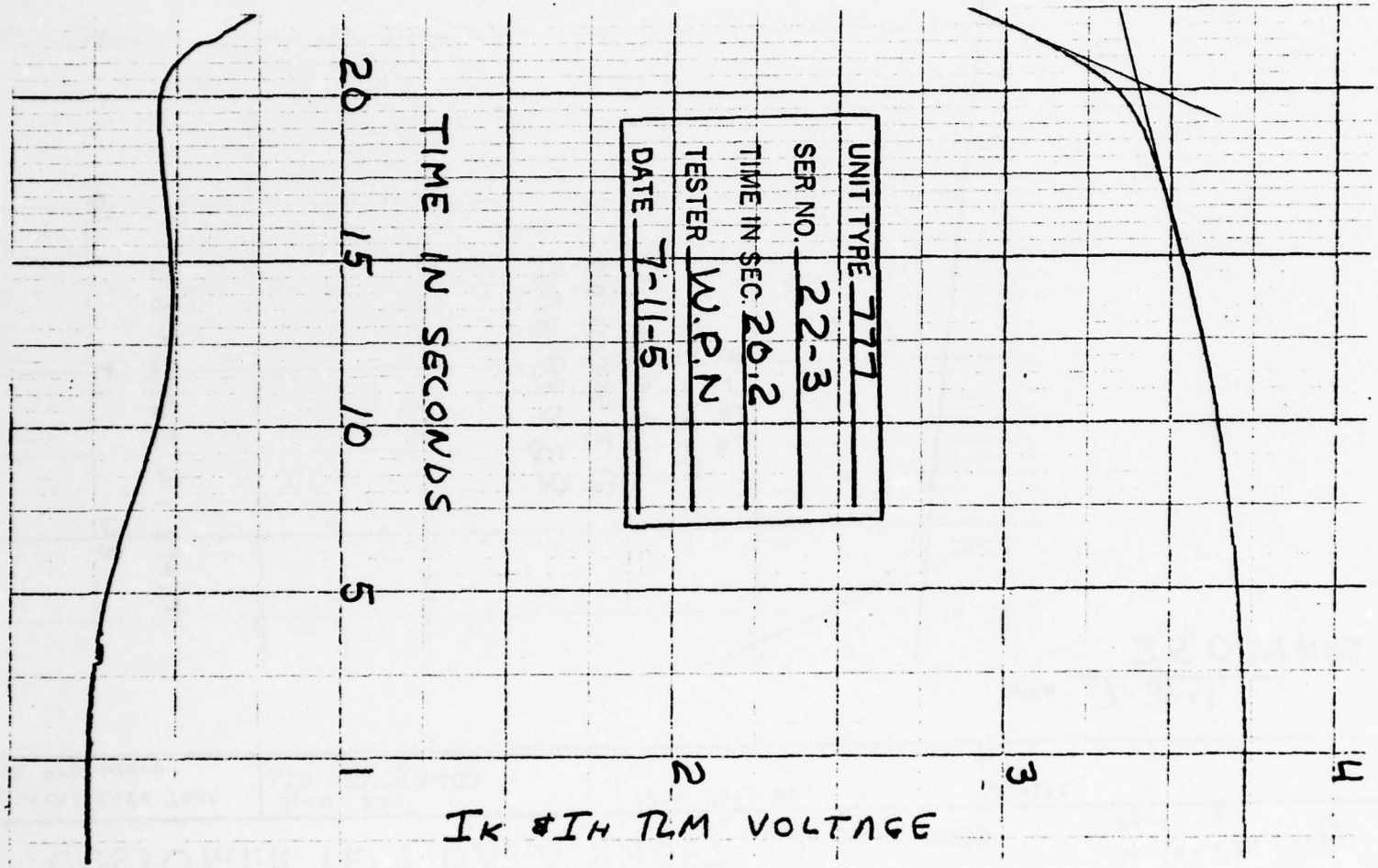
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Rev.
Model B20035 0-121 B20035 0-122
Serial No. 22-3


| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | | |

32,872 HRS

Date 7-11-5




Cathode Current (1M)
F-29

Time (sec)

HUGHES
HUGHES AIRCRAFT COMPANY

ELECTRON DYNAMICS DIVISION

Data Sheet No.

Rev.

Model B20035 0-121
B20035 0-122

Serial No.

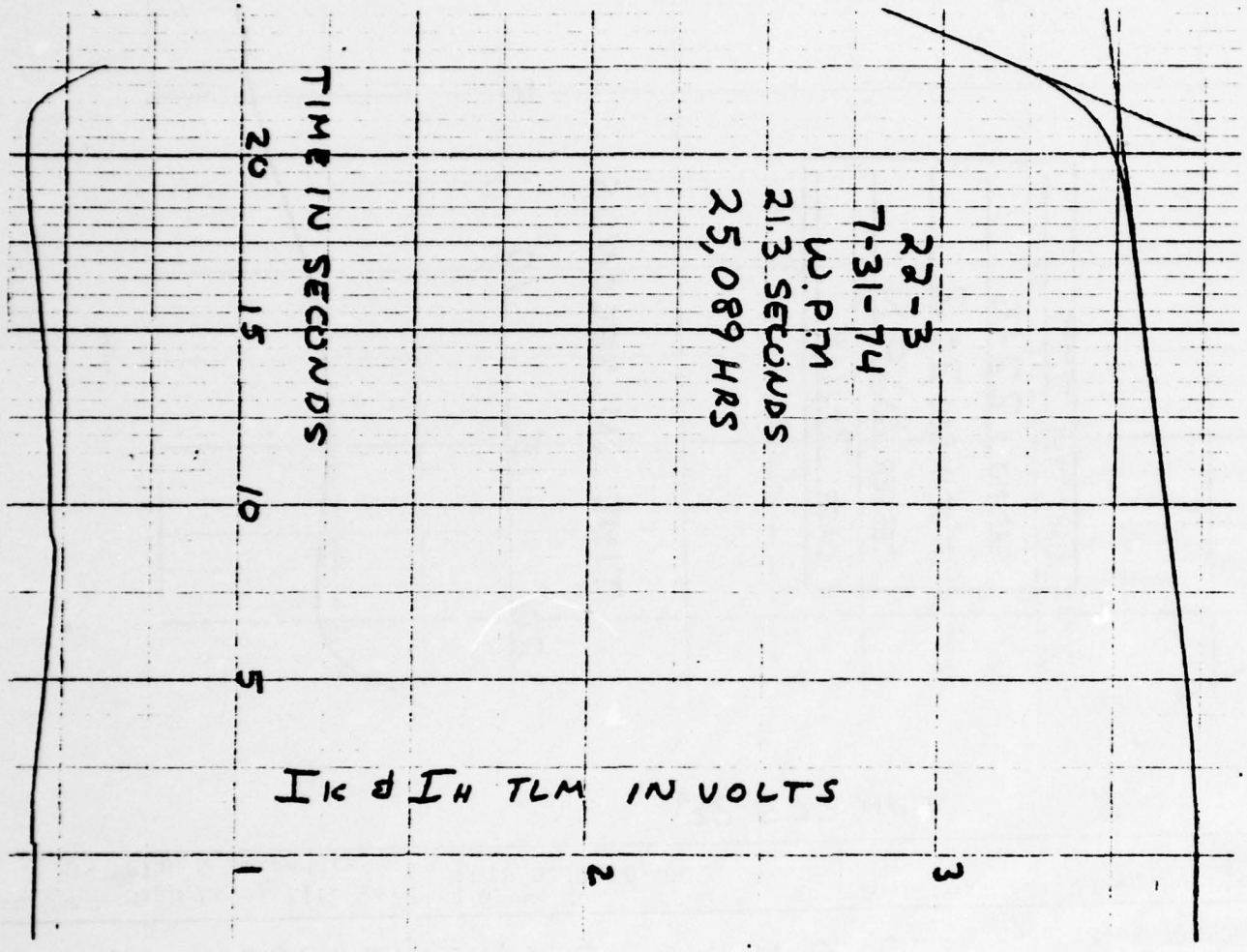
# CUSTOMER TEST DATA SHEET

Code Ident 73293



| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B200350-400 | | |

Date 7-3-74
25,089 HRS




Cathode Current (mA)

F-30

Time (sec)

HUGHES
HUGHES AIRCRAFT COMPANY

Par 4.5 Cathode Activity 13,200 Hour Test

ELECTRON DYNAMICS DIVISION

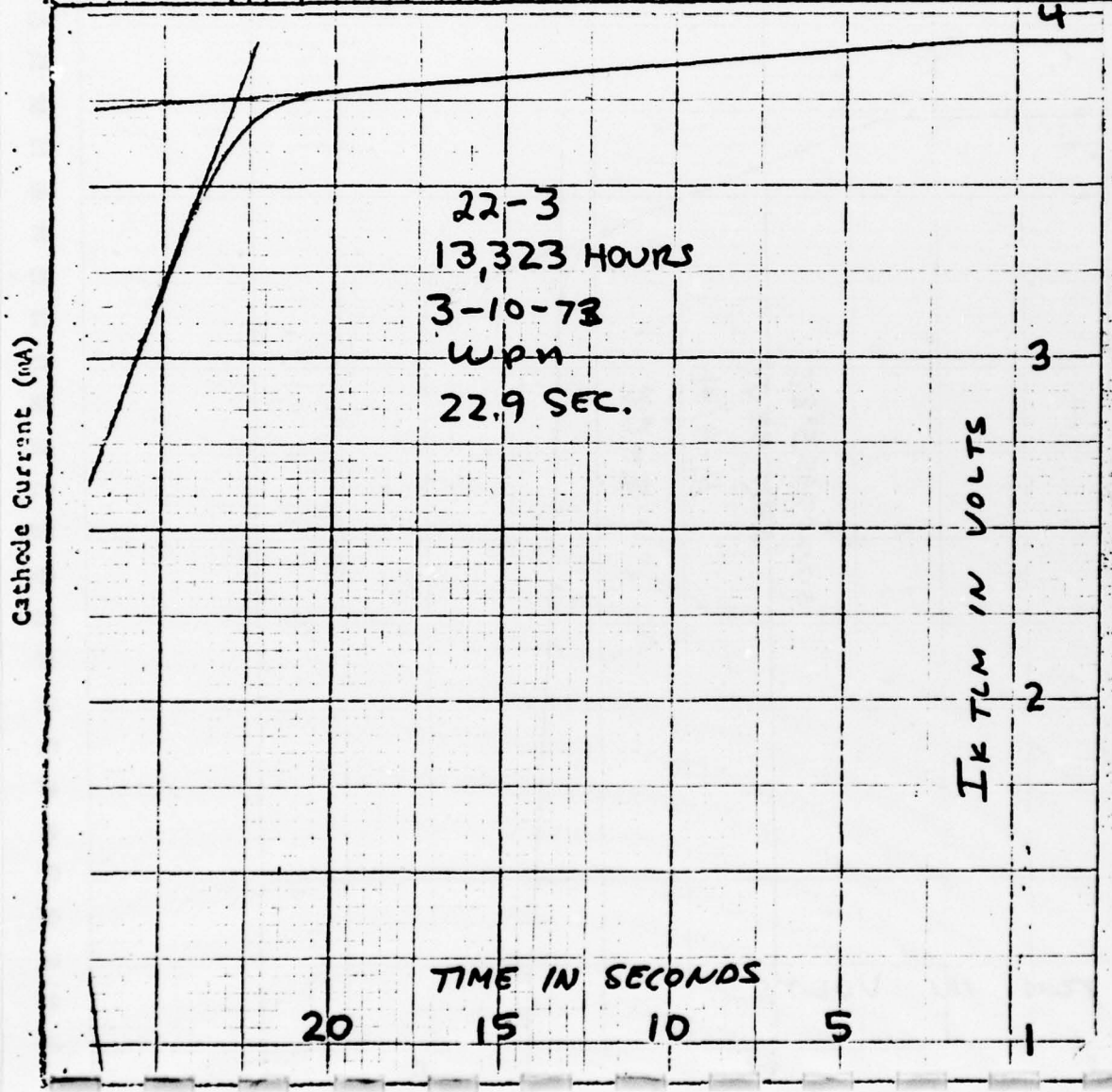
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Rev.
Model B20035O-122
Serial No. 22-3
Page 4 of 43

# CUSTOMER TEST DATA SHEET

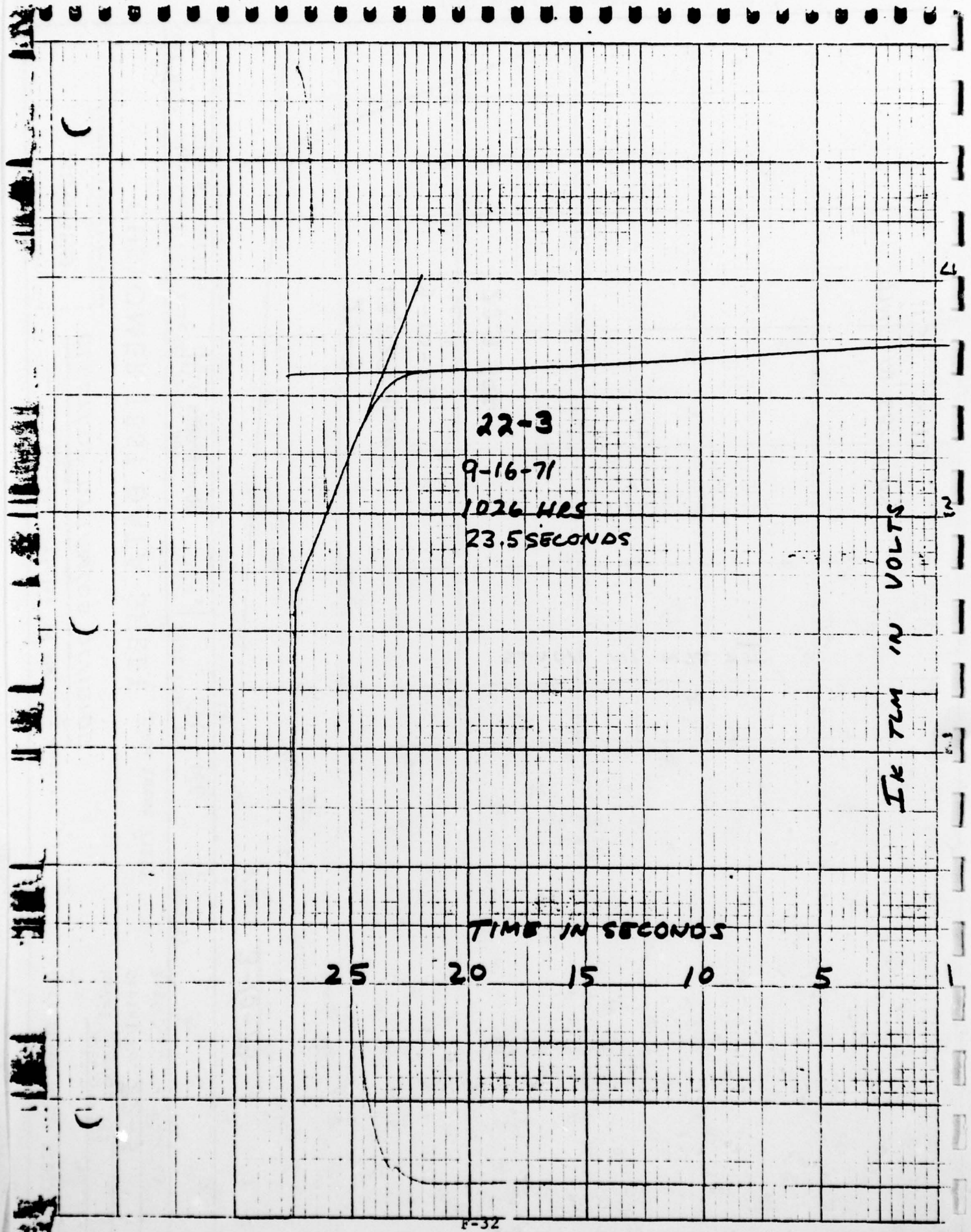
Code Ident 73293

| Test Name | Spec. No. | Test Pos. No. | Quality |
|---|---|---|---|
| High Level Life Test Plan & Procedure | LTP B20035 0-400 | QU-46 | |

Date 3-10-73




F-31


22-3
9-16-71
1026 HRS
23.5 SECONDS
TIME IN SECONDS
25
20
15
10
5
IK TEM IN VOLTS